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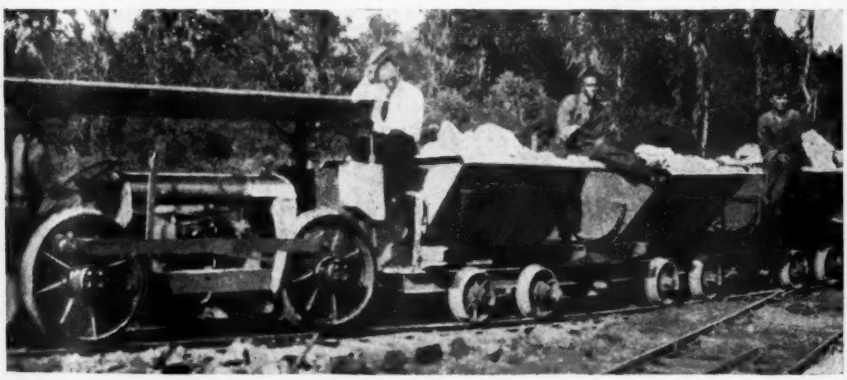

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ADAMSON MOTOR CO. Birmingham, Ala.

August, 1923

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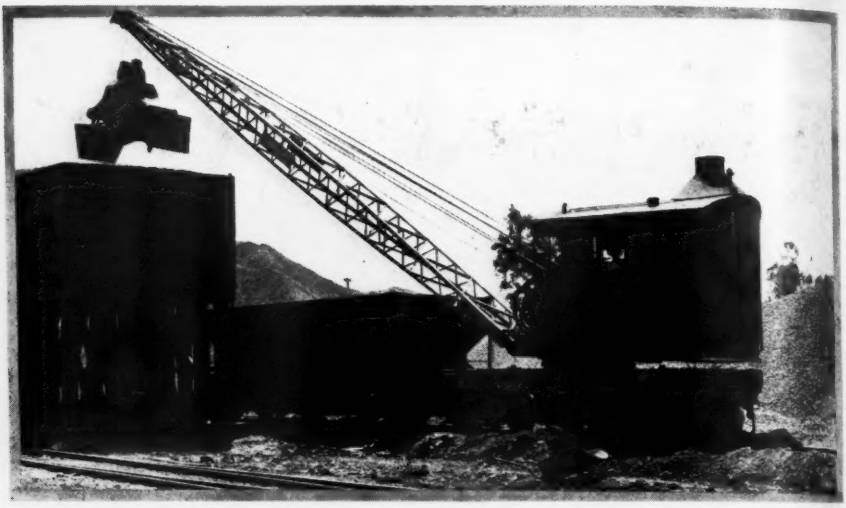

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BROWNHOIST

MATERIAL HANDLING MACHINERY

Pit and Quarry

Member Audit Bureau of Circulations
A Monthly Journal for Producers of Sand, Gravel, Stone, Cement, Gypsum and Lime

VOL. 7 CHICAGO, ILL., AUGUST, 1923 NO. 11

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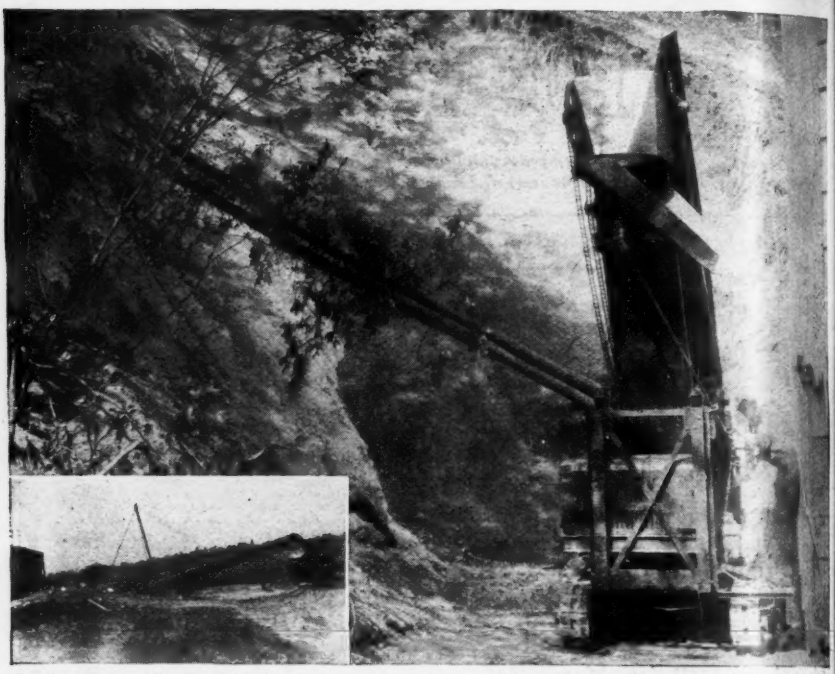

Barber-Greene Bucket Loader opening up a pit. At left, a Barber-Greene portable Belt Conveyor unloading cars at the rate of 16 a day as against half as many by other methods.

Opening up pits with a Barber-Greene

A Barber-Greene user writes us that the mobility of the Barber-Greene is one of many things in which the machine has exceeded their most enthusiastic expectations. They quit work with their Barber-Greene Bucket Loader at one pit at four o'clock one Thursday afternoon. In spite of the fact that it rained all day Friday, they moved the machine 22 miles and took 125 yards out of a new pit Saturday afternoon.

The same user says that with the Barber-Greene they start in one pit as soon as they have stripped a space twenty feet square, and go ahead with loading while stripping goes on over the rest of the new pit.

Other users frequently use their Barber-Greenes to do the stripping as well as the loading. In the installation reproduced above, the Barber-Greene was used to open up the new pit and is now loading at the rate of five yards in three minutes.

This machine is used both for loading molding sand and for loading road gravel. At one time some trees caved in but the loader got out of the way easily and early. Another user reports that he replaced a bucket elevator system with two Barber-Greene conveyors and thereby jumped up the production of washed and screened gravel from 50 tons per day to 400 tons. For additional information about Barber-Greene Bucket Loaders and Portable Belt Conveyors send for N cost reports and catalog.

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BARBER GREENE

Portable Belt Conveyors — Self Feeding Bucket Loaders

Pit and Quarry

Vol. 7 Chicago, Ill., August, 1923 No. 11

Confining A Blast

The common use of high explosives, such as dynamite, which can give fairly efficient results even when poorly handled, has lead many blasters to be indifferent in their loading methods. This has been the means of making the blasting of rock in many quarries less efficient and more expensive than it should be. In his travels of late, in visiting quarries, the writer has noticed these poor practices are followed to a great degree by a large number of blasters. It is true that some blasts that are so made can be termed efficient but this is due more to good luck than to good management.

There is an old slogan that says, "It is the little details that make the job great." This is true of blasting as it is the small details, provided the proper amount of powder is used, that makes the blast efficient and successful.

The first consideration in any blast is to have the charge at the bottom of the hole, and have it compacted in the smallest space possible. This shows the need in deep hole blasting to chamber the hole by springing. In some kinds of rock it is possible, at a small cost, so to chamber the hole as to confine the entire charge in the chamber. This will always give the best results. If, though, some of the charge must be put in the bore of the hole, the explosives should be well compacted.

All explosives should be made as compact as possible in the hole, for air spaces only help the charge to be cushioned. Miners have learned in their shallow hole blasting that, if the bore of their hole is not filled with explosive, the air thus left in the hole may cause the charge to shoot out, just as the load does out of a shot gun, causing what they term a "misfire." Exactly the same results come from deep hole blasting when air spaces are left in and around the charge. The results are not as marked, as the large charge used will disrupt and throw down some rock, yet some of the force of the explosive will be used to compress the air around it and as the rock is opened up this compressed air will force up some of the charge through the hole or opening, thus having the same tendency to waste some of the force of the explosive.

It is for this reason, when dynamite is used and water is not in the hole, that the wrappers should be cut or taken off so that as the dynamite will be tamped and compacted, it will fill every crevice in the hole. This is not often done.

If a granular powder is used, several sizes of grains should be used in the same hole. The writer always made a practice of using at least two sizes of grains and, if possible, three sizes. The great trouble in this loading is to get the different sizes of powder so well mixed so as to reduce the interstices between the grains so as to make the charge a dense one. If a powder of this kind, already properly mixed, can be obtained, better blasting may be done. It is fortunate today for powder users that there is such a powder on the market.

The writer in deep heavy blasting has used to an extensive degree pat-

ented powders that are put up in bags and are even without grains, being granulated but not made into glazed grains. These powders are more easily compacted than any others without danger from excessive tamping, and, although they are not as high an explosive as dynamite, yet if used with judgment and at the proper time are just as efficient. Cheaper blasting can be done with them than with dynamite. Accurate records of the cost of many blasts have proved this beyond any doubt.

In the writer's opinion much money is wasted in blasting by the lack of knowledge among blasters and buyers of explosives. Many of these seem to think that the more powerful the explosive the better and cheaper the blasting will be. This is not literally true. The writer remembers, before the American Railway Association placed a limit upon the percentage of nitro glycerine that dynamite could contain, that many users of explosives ordered high percentages. Now that they cannot get them, they do just as efficient blasting. The writer once experimented with a lot of 80 per cent dynamite and concluded the cost of blasting was made excessive. There are many cases in blasting where, if the explosives are handled properly and used with judgment, the lower explosive is best. Just as efficient blasting is done and done much more cheaply. It would be quite surprising to some quarry operators to find out how much money can be saved by experimenting with various kinds of powder. There is an old story that a student once asked the celebrated artist, Opie. "Mr. Opie," asked the young man, "how do you mix your paints?" "With brains," was the reply of the celebrated artist. It takes brains to handle and use explosives and also knowledge of the properties of powder.

With the load properly compacted the next question is the properly placing of the detonator. If an electrical exploder is used for this purpose it should be placed as near the center of the charge as possible, as the best results will then be obtained. If a fuse and a cap is used to explode the blast, the detonator should be put near the top of the charge. But, because of the danger of the fuse leaking and thus setting fire to part of the charge, it would also be well to place the cap near the center of the charge. But, even with the improved fuse used today, there is always some danger of a fire-leak, so that it is deemed expedient, even at the expense of a less efficient blast, to place the cap near the top.

It is needless at this time to say anything about crimping a cap on a fuse, as on page 73 of the July issue of PIT AND QUARRY the right and wrong way of doing this work was illustrated and described. One thing, though, that was not described was the proper method of placing the cap in a stick of dynamite. The proper way is to unfold the paper at one end of the dynamite and, by means of a sharp pointed hard wood stick work out a hole in the dynamite and in this hole insert the cap. The paper of the wrapper of the stick of dynamite is then gathered around the fuse and by means of a string is tied tightly. The same method can be used to insert an electrical exploder into a stick of dynamite, but a more common method is to punch a hole, on an angle, into the sides of a stick of dynamite and after inserting the cap of the exploder into this hole to take a hitch with the wires around the stick of dynamite thus secure it tightly. A cap and fuse are sometimes fastened to a stick of dynamite in this same manner by some blasters, but this is an improper method. The fuse is likely to be broken by making the hitch and thus a fire-leak can occur

and the blast set on fire before it is detonated.

After the exploder is placed in the charge the next thing is to confine the charge by stemming the hole. For this there should be provided some dry sand, or light clay or loam. As this material is poured into the hole it should be well tamped and compacted. The tamping should be carried well towards the top of the hole so as to give all the resistance possible to the force of the blast. Blast holes that are shot without being tamped seldom result in efficient blasting. Care should be exercised not to have small particles of sharp stone in the tamping material, as there is danger of these stones cutting the fuse, causing a misfire. If electrical exploders are used these stones will cut the insulation off the wires, causing short circuits.

Cement Association Changes

The Portland Cement Association announces the appointment of Walter B. Elcock as assistant general manager in charge of the Southeastern offices of the Portland Cement Association.

Mr. Elcock joined the staff of the Portland Cement Association in April, 1914. During 1915 he was division engineer in charge of association work in Colorado, Utah, Wyoming and Idaho. In 1916 he was appointed district manager in charge of the Atlanta office. He has been continuously with the association since joining our staff, excepting for two years spent in the army during the war as major of infantry.

Mr. Elcock's headquarters will be as heretofore at the Portland Cement Association office in the Hurt Building, Atlanta.

Association district offices have recently been opened in New Orleans, Jacksonville, Birmingham and Memphis. These offices, as well as one to be established in Raleigh, will increase the effectiveness of Association's service to users of cement and concrete in Tennessee, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi and Louisiana.

Slate Association Leader Dies

It is a curious working of fate that the man who offered the resolution on April 20th, 1922, making the National Slate Association a practical possibility, and who became its first President, should be the first one called to the Great Beyond.

William Henry Keenan died July 20, after a violent and unexpected prolonged acute heart attack Thursday night. He had practically and satisfactorily recovered from an appendicitis operation and was soon to have left the hospital. He seemed to have a premonition of death, because of many remarks made before going to the hospital and during the attack suffered at the Atlantic City meeting.

He was ever ready to counsel and guide others in the industry. His word once given by pen or verbally was a bond. Some men too lightly view their pledged word. He was never known to take unfair advantage of any man or to refuse to deliver slate or orders at lower levels simply because with an advancing market or larger demand the same slate could be sold at higher prices.

Born in Rutland County, Vermont, he was an ideal President because he blended the viewpoint of two major producing sections of the industry. He is survived by his brother Michael. Mr. Keenan has been actively engaged in every branch of the Slate Industry, and the properties under his direction developed into one of the largest operations producing blackboard, structural and roofing slate.

Shipments of cement from mills in central and northern California have greatly relieved the acute shortage existing for several weeks, and the announcement by the Riverside Portland and other cement concerns of immediate enlargement of their plants to increase production is regarded as guarantee for the future. The cement manufacturers say that in sixty days their enlarged mills will be able to supply the local demand.

Immense quantities of "silver" sand are being brought here from Holland. It is being shipped to glassmaking centers for the manufacture of the finest qualities of glass.

Bins For Grab Buckets

When bins for stone gravel or sand are filled by hand, elevators or belt conveyors or even by means of chutes from screens, it matters little what design the top of the bins may be. It is generally customary to have the tops level on all sides. But when grab buckets are used for loading bins the design of the top is important, for it must be so shaped that the operator who is standing on the ground will be able to spot his bucket over any part of the bin he desires.

It is true that much rehandling of material in pit and quarry operations is done by means of grab buckets loading material directly into vehicles. In such cases bins are not used. There are numerous cases, though, where material must be elevated and dumped into the bins by means of grab buckets and at times these buckets must also be used for taking material out of the bin.

With bins designed as they ordinarily are, much stone or material that is being handled is dumped over the sides. When buckets are used for unloading material from the bins the sides of the bins are frequently broken and torn by the heavy grab buckets, as the operator must do a lot of guessing in spotting his bucket over the material as he picks up a load.

All of these things can be prevented by changing the design so tnat the top of the bin is lower on the side toward the operator. In order to make the bin hold the same amount of material it is necessary to increase the height of the opposite side. It has been found that for bins for twenty feet or less in width that to cut the sides down six inches for each foot of width from the center and raise the opposite side six inches for each foot of width from the center, allows the operator to see the bucket in the bin at all times and to know if he is spotting it correctly.

Thus for a bin twenty feet wide the side towards the operator would be five feet lower than the center and the opposite side would be five feet higher than the center. The ends would conform to this slope. Such a bin would have the same capacity as though made level from the center.

For bins of more than twenty feet in width it has been found that to cut the sides four inches for each foot of width is sufficient to allow the operator to see his bucket. If material is to be dumped entirely by gravity in the bin, the bottom of the bin in order to clear all the material, should be built hopper shaped, but if material is to be taken by gravity from the bottom of the bin and also grab buckets are to be used to empty them, the bottom of the bins should be made flat. This will allow the greater part of the material to run through the bottom gates if that is desirable and the sides and ends can be cleaned up with the grab bucket. In hopper bottom bins the hopper bottom will not allow the grab bucket to take the last material out as it will not be large enough to allow the bucket to operate in it without tearing the sides to pieces.

Thus it can be seen that, when grab buckets are used in connection with bins, the latter should be designed differently than when such buckets are not used. The writer has called attention to these facts in articles some years ago, but recently in his travels he has seen many operations where these facts were not known or, if known, were ignored. Therefore it seems wise again to call attention to the thing that means the saving of money. It seems that each generation must learn certain facts for themselves.

Webster County, Iowa, will probably own one or more of its own gravel pits in a short time if plans being carried out to purchase pits are completed.

Maintenance Experiment

Gravel Company Keeping Up Seven Miles of Road in Its Own County

The Greenville Gravel Company, Greenville, Ohio, is doing a really serviceable piece of work for its own county, and incidentally, for the gravel industry generally, by taking over the maintenance of seven miles of one of the principal highways in Darke county, the county in which Greenville is situated.

This company graded and drained the roadway at its own expense and is now giving this road full time maintenance with washed gravel and will continue this work at its own expense for five or six years. The first year was recently completed and the result was so striking that not only did the officials of Darke county take up the idea as a general plan, but the officials of other counties in western Ohio made pilgrimages to Darke county to see this road, and as a result the idea is being put into practice in many other places.

Mr. F. D. Coppock, president of the company, has recently written a booklet describing the work the company is doing in this respect and is having a large number of these pamphlets printed for distribution.

In regard to the material which should be used for this work, Mr. Coppock says:

"Next in importance to drainage and the proper preparation of the road bed, is the character of the material which is placed on the road. Present-day traffic requires a different material than formerly. Experience has already taught engineers and those boards and officers having charge of road maintenance that the old methods are inadequate and impractical. The past two years have clearly demonstrated the imperative need of not only adequate drainage and good road beds but of high class material in order to avoid the almost impassable road conditions that we have had during the thawing season of the past few years.

"The average bank-run or pit-run gravel, as found in local deposits and commonly used, has been proven unfit for use in road maintenance. These deposits do not run uniform in coarseness or quality. Very often they contain too much sand; always too much loam; and at times, too many boulders, which renders the material unfit.

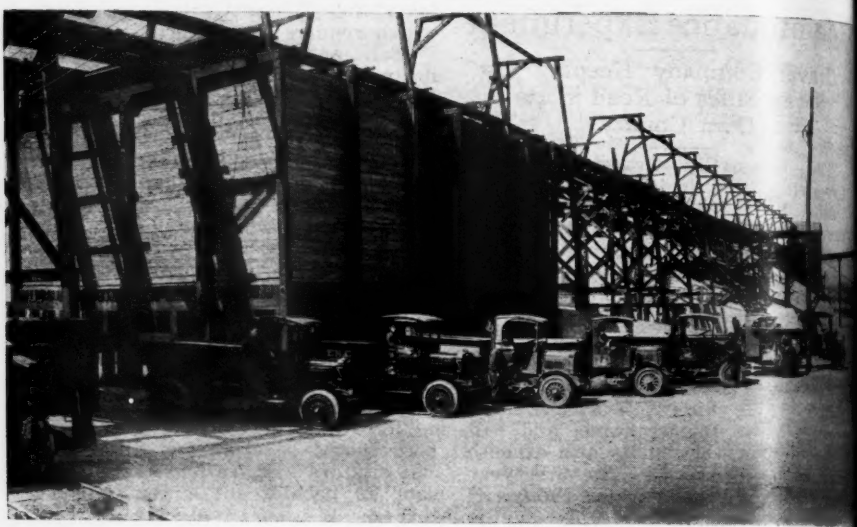
"Sand and loam create dust, prevent drainage, and retain moisture. In thawing seasons dirty gravel becomes very soft because of the moisture it contains. The old idea, that repair gravel should be mixed with loam in order to make it pack quickly, is an erroneous one. Repair gravel should have no loam whatever in it. Clean gravel will pack without hindrance to traffic if properly applied and maintained.

"Boulders or large stones are very objectionable, as they are inclined to work to the surface, causing an expense to remove and also creating bumps which in turn cause chucks.

"In road construction the gravel used should be clean and uniform in its mixtures of various sizes from sand to pebbles not larger than 1½ inches. At least twenty-five per cent, but not to exceed thirty-five per cent of fine sand 1/10 inch down should be mixed with the gravel for road construction. A proper sand mixture prevents the sub-soil from coming up through the gravel, which is apt to happen under heavy traffic, at the same time an excess of sand is undesirable. Where a partial rebuilding is needed, or where the road is so nearly worn out that a light surface treatment is not sufficient, a clean gravel should be used, ranging in size from sand to 1½ inches.

"For maintaining the average gravel road the material should be that of a very fine gravel without sand. A washed and screened pebble ranging in size from 1/10 to ¼ inch has proven satisfactory; preferably a pebble from 1/10 inch to ½ inch. Never use larger than ¾-inch pebbles. This should be applied in very thin layers as required. Each application should be a little more than enough to absorb all the worn-out particles of mud and soil on the surface of the road. There should at all times be a loose thin coating of this material on the road surface. The dragging of the road will move this loose material back and forth, filling in the low places as they occur and keeping the road smooth at all times.

"The reason why a fine gravel is better than coarser material for a road dressing or surface is that if larger particles are used the process of dragging will pull the larger stones loose from the surface, making it rough and impossible to keep smooth."



Plant of E. T. S

Excessive Rains Hinder

But Good Output of Materials Maintained at Louisville

By Our Louisville Correspondent

With the exception of the interference that has come through excessive rainfall for the season, business is moving along very nicely both with the crushed stone people and in the river sand and gravel business. Rains have interfered both with road work and with general construction and prevented fulltime work and a full measure of progress all around; but incidently it has brought some relief by making help a little more plentiful. And another relieving factor is a better supply of cars.

The rains have brought a fairly flush tide of water to the river but this has not been any serious handicap to the progress of river digging operations, and on the whole the sand and gravel concerns here have been very busy of late. Those prominent in river sand and gravel operations here are the E. T. Slider Co., with yards in Louisville and across the river to New Albany and also a plant down the river at Lockport; the Ohio River Sand Co., and the Nugent Sand Co. All three of these are along the water front in the upper part of town and they are all busy at this writing.

The Ohio River Sand Co., reports that they are not only busy in their river work but they also are busy at local delivery and have a good run of carload shipments going to different points in the territory.

This is pretty much the story all around, and fortunately for the carload trade there is improvement in the railway situation and plenty of cars are available now.

The better situation in the matter of cars and transportation is helping out in quarry operations too, but quite a lot of the quarry work of the day is now centered on and coupled with road contract work.

This is illustrated by the doings of the R. B. Typer Co. They are operating four crushing plants now, all of them in connection with road work and road contracts. They are not operating their big crushing plant near Louisville for commercial work because so far there has not been enough promise of business to encourage opening it. There seems to be a fair share of railway business with plants out in the state, and it is the railway ballast work and the road contracts which overshadow all other factors in quarry and crushing operations at the present time.

The outlook all told is for a busy and prosperous summer run both in the quarries and crushing plants and among the sand and gravel operators.

sville, Ky.

Output of Abrasives in 1922

The output of grindstones and pulpstones in the United States in 1922 amounted to 26,524 short tons, valued at $1,020,186, according to figures reported by the producers to the Department of the Interior through the Geological Survey. These figures show an increase of less than 1 per cent in quantity and a decrease of 17 per cent in value.

The grindstones produced amounted to 21,367 short tons, valued at $574,900, an increase of 31 per cent in quantity and 20 per cent in value.

The pulpstones produced amounted to 5,157 short tons (1,619 pieces) valued at $445,286, a decrease of 48 per cent in quantity and 41 per cent in value. The demand at paper mills, which were very active late in 1920 and early in 1921 and which during and after the war could not renew their supply of English stone, increased the market for domestic pulpstones in 1921, but the depression that followed this activity caused a decrease in the output of pulpstones in 1922.

The grindstones were produced in Michigan, Ohio, and West Virginia and the pulpstones in Ohio and West Virginia.

The imports of grindstones and pulpstones were valued at $49,993, as against $81,880 in 1921. The exports of grindstones were valued at $281,413 as against $281,976 in 1921.

According to reports of producers to the Department of the Interior through the Geological Survey, the production of scythestones, oilstones and whetstones, rubbing stones, and hones in the United States in 1922 amounted to 1,016 short tons, valued at $197,450, an increase in output over 1921 of 22 per cent in quantity and 14 per cent in value. These products are manufactured from stone quarried in Arkansas, Indiana, Kentucky, New Hampshire, Ohio, and Vermont.

The sales of emery increased 1,163 tons, or 381 per cent, in 1922, and the average value increased to $11.93 a ton, as compared with $7.38 in 1921. There was a corresponding increase of 131 per cent in the quantity of abrsive garnet sold in 1922. The average value of the garnet per ton, however, dropped from $85.53 to $80.36.

There was 35 per cent more pumice sold in 1922 than in 1921, and the average value per ton was $3.75, or 52 cents less.

The output of grinding pebbles and tube mill lining increased 196 per cent and 331 per cent, respectively.

The sand and gravel pits of J. U. Loftsgordon, Burke, Wisconsin, have been leased by the Waukesha Washed Sand and Gravel Co. This new company in Madison, will be known as the Madison Washed Sand and Gravel Co. Equipment, estimated to cost $50,000, will be installed.

Tractors For Pit and Quarry Operations

The old type of steam traction engine was found useful for many purposes but, being long coupled and high in build, could not be used to advantage over rough ground and on steep slopes. The use of caterpillar traction was found to be an improvement but, with the advent of the gasoline and oil motors, new designs were brought out so that the modern tractor is short connected and of low build.

This allows it, especially with caterpillar traction, to operate in rough ground, over steep slopes and make sharp turns. Thus the use of tractors has been wonderfully increased and today many industries find that one or more tractors are a decided asset.

This is true of the pit and quarry industries, for tractors can be used for a number of different operations. These uses will not only be as tractors, but also as power plants to operate different kinds of machines.

Thus, if a tractor is not being used for hauling and some temporary pumping has to be done, the engine can be connected to a pump by means of a belt and thus a pit could be unwatered. In the same way a wagon loader can be operated and stone rehandled. Most loaders are equipped with engines or motors, but these machines can be bought for less money without a motor, and it is for this type that the tractor can be used.

A high power tractor can also be used for operating a small auxiliary crusher, or for a screening or washing plant to advantage. At times a small air compressor is needed and the tractor can be brought into use for this. A small portable saw mill can also be operated by a tractor or a rotary saw for cutting up cord wood. By this means, if logs are available, ties for tracks can be sawed out and heavy timbers and planks produced for towers, bins, chutes and even buildings. In this way timber that would otherwise go to waste can be saved and put to use.

As many sand and stone producers own large acreages and use some parts for farming, raising feed for their horses and mules the tractor can be used to operate feed cutting and grinding machines. For a farm a tractor has become almost a necessity, but that is another story.

For quarries and sand and gravel pits a tractor can be used for stripping to advantage. If a steam shovel is employed for the excavation, a tractor with two or three heavy dump wagons can be used for hauling the overburden away. It is also possible to use a train of two wheeled scrapers behind a tractor for excavation, and in place of the two wheeled scrapers a train of four wheeled scrapers will be found economical. A tractor can also be used for moving a steam shovel from different parts of the operation.

Tractors can likewise be used for hauling sand and gravel from the bank or pit to the washer or grading plant, using engines or trailer cars. Stone can also be handled to the crushers in the same way. Some tractors can be used on rails for hauling cars by changing the wheels from traction to regular railroad wheels.

In some cases tractors can also be used with wagons or trailer cars for delivering products to the customer. For long hauls, through large towns and cities, the automobile truck is cheaper and also quicker.

A tractor with a road machine can also be used in making and maintaining roads to and from the operation.

These remarks show the great variety of uses to which tractors, can be put, and those who have never used them should at once look into their merits.

View of Plant of Ballina Sand and Stone Company.

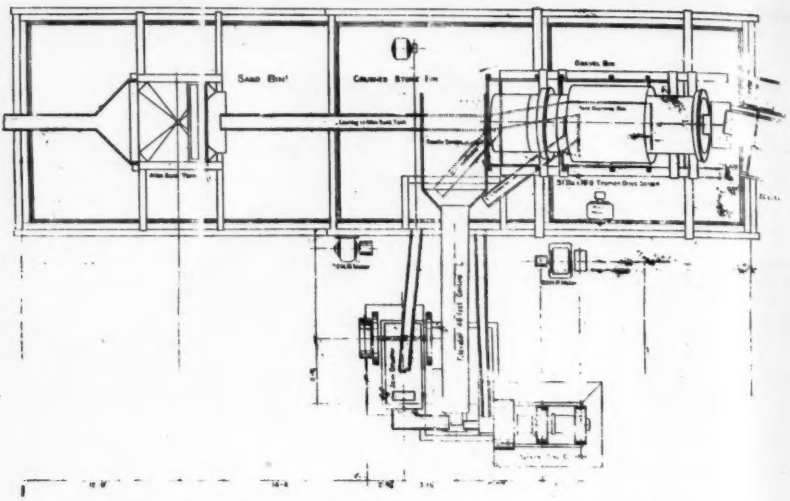
Producing Gravel and Crushed Gravel

THE Ballina Sand & Stone Co., an enterprise owned and operated by the McCain Realty Co., Syracuse, N. Y., is an up and coming concern that bids fair to an important position in the gravel production activities of the section that it serves. Located some 25 miles from Syracuse, it is able to reach that big center and a number of others where the demand for sand and gravel is considerable.

The deposit which the company is working extends over 10 acres and contains good materials to a depth that makes possible the maintenance of a working force 60 to 70 feet in height. The gravel is of good quality, analysis showing it to be very clean material and tests for road building purposes indicate that the strength, toughness and wearing qualities are sufficient to make it desirable for road building purposes.

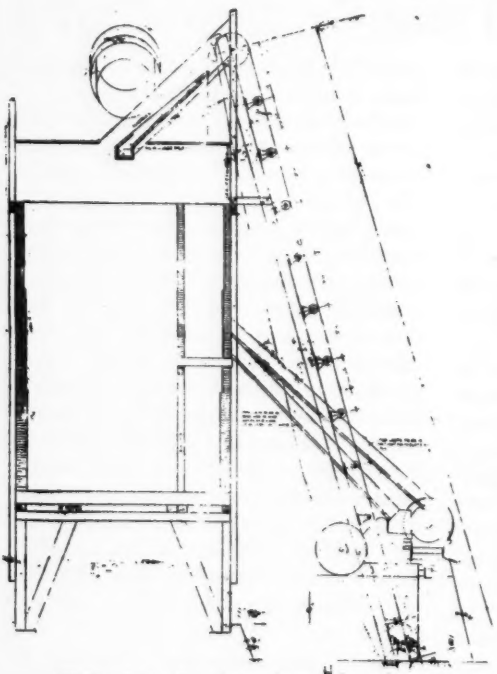
The material is excavated and conveyed to the plant by a 1¾ yard power drag scraper manufactured by L. P. Green of Chicago, Ill. This piece of equipment is operated from a Lambert hoist and draws its power from a 125 horse power Primm oil engine located in the hoist house. From this point on, the general plan of operation calls for dumping the scraper load over a grizzly into a hopper from the bottom of which it is taken up by a belt conveyor to the plant proper. Discharge from the belt conveyor is into a large rotary washing screen. Large sizes are droped to a disc crusher or a jaw crusher, the product from which is carried back by elevator and introduced into another screening process. The sands are passed on to the sand tank which performs the office of washing, dewatering and grading the materials.

The Green scraper is arranged to operate at a radius of 300 feet. The



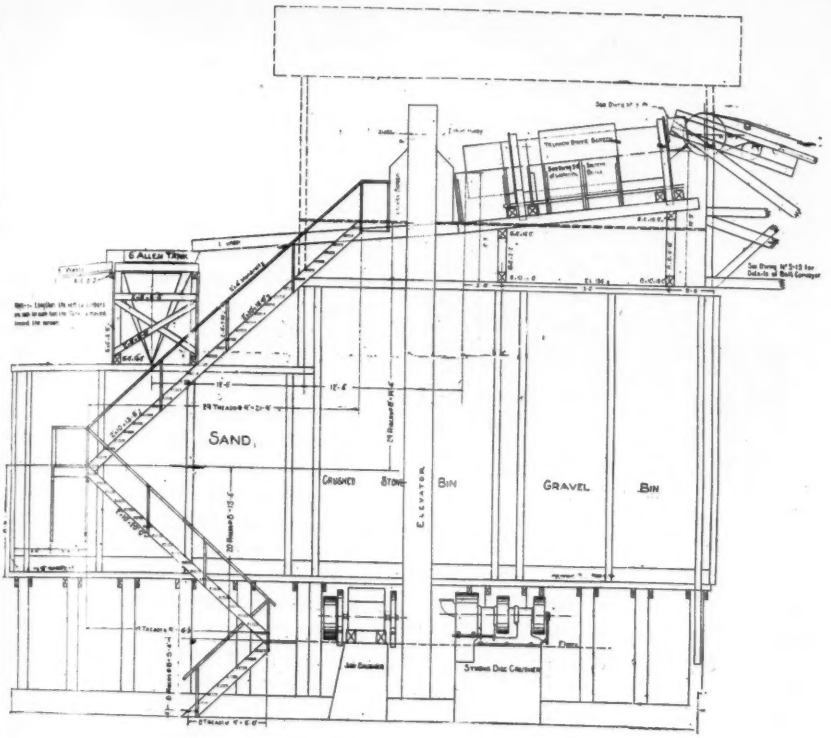
Plan view of plant of Ballina Sand and Stone Company

hoist is located a little back of the receiving hopper toward the plant and to the right of the conveyor, looking at the plant from the front. The mast will be located at various points around the outside of the hopper, so that the hopper will always be between the mast and the ground over which the scraper is working. Thus when the digging is straight ahead the mast will be at the back of the hopper, when the digging is to the left and forward the mast will be toward the right and back. In this way it will be possible to make the scraper excavate in all directions from the hopper, except directly back of it, thus leaving only the spot of ground on which the main conveyor is built. When all the material within the 300 foot radius is exhausted the hoist and scraper can be located further afield and a field conveyor installed to bring the sand and gravel to the plant.

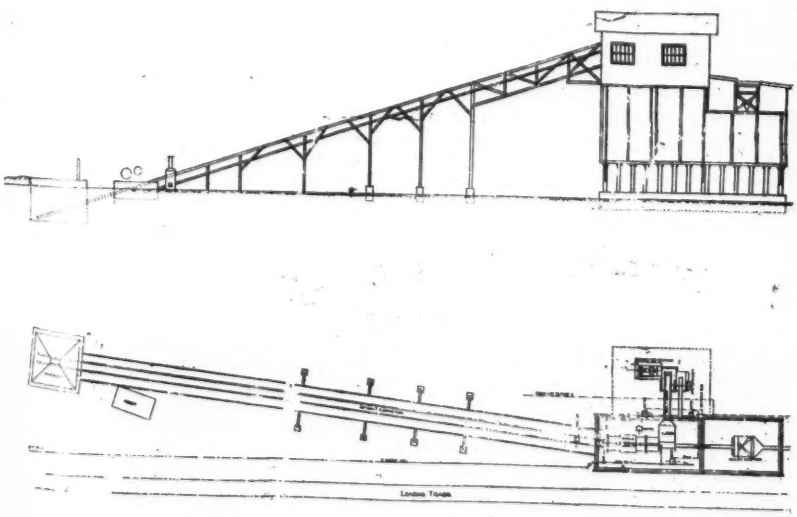


End view showing elevator and rotary and gravity screens

The 20 inch belt conveyor which supplies the plant with materials discharges at a 16 foot trunnion drive screen, 51 inches in diameter, surrounded at the middle section by a sand gathering box. This screen is driven by a 15 horsepower Burke



Side elevation showing flow of materials



General layout views, plan and side elevation

View showing facilities for loading trucks and cars

motor which transmits its power through a belt and spur and bevel gears. The elevator is operated by a 10 horsepower motor, a Burke as are all others through the plant.

Gravel that passes the screen is chuted directly to gravel bins, the stone that is too large to pass the rings is sent to the crushers, and the sand is sent from the gathering box to a 6 foot Allen cone through a launder extending over the crushed stone and sand bins.

Gravel that is too large for chuting directly to the bins is separated into two grades and passed as separate materials to one of the two crushers, the crusher to which it drops being determined by the size of the material. Minus 1¼ inch gravel is dropped to a Symons disc crusher and all over 2¼ inches goes to a Champion jaw crusher. The products of both these crushers are spouted to the boot of a bracket elevator, 46 feet between centers, which carries the crushed gravel to the top of the plant and discharges at a gravity screen located at the end of the 16 foot rotary screen. This screen makes a separation of two stone sizes which drop into special crushed stone bins from where the products are drawn off and sold as crushed gravel.

This practice of keeping the crushed material separated from the regular run of graded gravels is one that is not endorsed, or, at least, not followed by the majority of gravel producers. The merit of the plan could appear to be determined to a considerable degree by the amount of material that requires crushing and the consequent production of quantities large enough to be commercially important or too small to be bothered with. In the case of the Ballina Sand and Stone Company there is sufficient large material requiring crushing to justify the separation of the crushed product from the regular run of material and this crushed stone forms a valuable part of the plant's output.

As described above, the Allen cone is supplied with sand by a launder running from the sand gathering box to the cone. Arriving at the cone the sand is thoroughly washed and the wash water is passed to a short waste

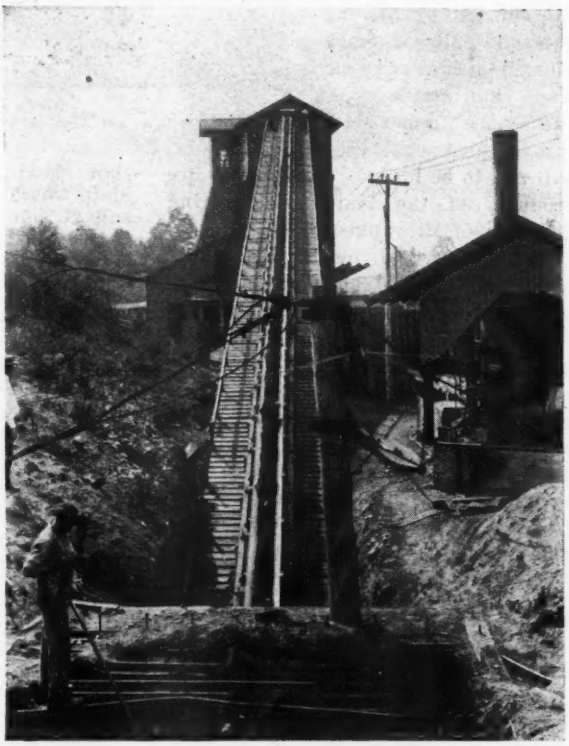
Panoramic view showing plant, deposit and track system

flume which conducts it to a pipe dropping directly down at the end of the plant. This pipe carries it to the creek from which the water is secured in the first place.

After washing, the sand is drawn off at the bottom of the cone and passed to the sand bins as a clean, washed product. The company contemplates the installation of another Allen cone at some time in the future to take care of the fine sands that will run off in the waste water from the single cone. Provision has been made for this addition and it will be necessary only to move the present cone nearer the screen, thus leaving room at the end for the second cone. When the first cone is moved forward it will be raised 1 inch for each foot moved, so that the carefully calculated inclination of the launder will remain unchanged.

By the way the term "launder" will be an unfamiliar one to many sand and gravel operators who are accustomed to call the trough in which water is run a "flume". Launder is defined in Bureau of Mines publications as "a trough, channel or gutter, by which water is conveyed; specifically in mining, a chute or trough for conveying powdered ore, or for carrying water to or from the crushing apparatus." In this particular case the term is in very good use, although the specific set of

Green power drag scraper excavating the sand and gravel

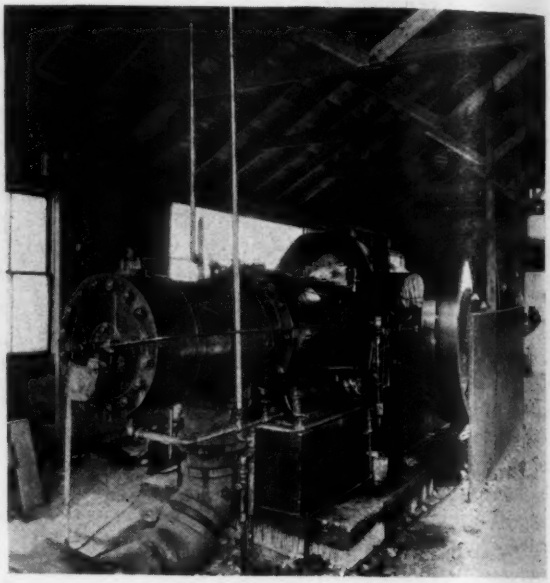


Looking up the main conveyor; hopper and bar grizzly in foreground

conditions under which it is operating are not mentioned in the Bureau of Mines definition.

Water for the washing operation, introduced at the point where the sand and gravel enter the rotary screen, is supplied through a 6 inch pipe by a 5 inch Gould pump which sends it from a creek 1500 feet from the plant.

The plant was designed for car and truck loading and has quadrant bin gates extending over the railroad track alongside and clam-shell bin gates over the space underneath into which trucks will run to be loaded. These gates are products of the Smith Engineering Company of Milwaukee, Wis.



The Primm oil engine which operates the hoist

The plant which has a capacity of 1000 yards per 10 hour day was designed by Edmund Shaw, consulting engineer, Chicago, Ill. Mr. Shaw has laid out a plant that comes up to the best expectations of the owners and is producing steadily a large volume of well washed and graded materials.

Most of the equipment, including the elevator, conveyor, screens and jaw crusher, was furnished by the Good Roads Machinery Company of Kennett Square, Pennsylvania.

Miscellaneous Uses for Waste Slate

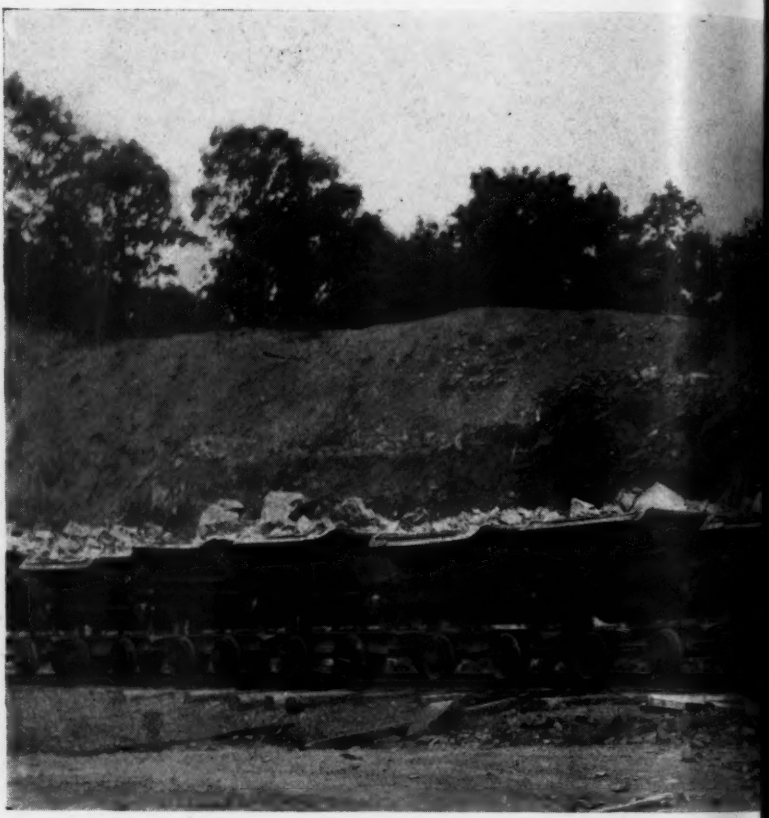
Waste slate fragments may be utilized to some extent for sidewalk stone, building stone, and fence posts, states Dr. Oliver Bowles, mineral technologist of the Department of the Interior, in Bulletin 218 of the Bureau of Mines. As slate presents an exceptionally satisfactory surface for painting, the use of waste slabs for sign boards merits consideration. Slate waste has been tried as railroad ballast, but the tendency for the flat fragments to slide on each other results in instability and gradual flattening of the grade. Consequently there is no prospect of finding any extended field of utilization in railroad work except possibly in the use of the larger massive fragments. Slate pulverizes to dust too readily for a road surface, but it may have some value in road construction when applied to the lower courses.

.The Missouri Public Service Commission has ordered new freight rates on agricultural limestone varying from advances between certain points to as much as thirty-five per cent. Witnesses from the Missouri College of Agriculture and a number of other Agricultural Associations appeared before the commission to ask for a rate reduction.

Construction of the first unit of what will eventually be one of the largest plants for the manufacture of gypsum products in the Southwest will be started at Sweetwater, Tex. in the near future. When completed the plant will represent an investment of $1,000,000.

A considerable impression has already been made upon the deposit by the scraper

Giving an idea of the character of the deposit



21 Plymouth Locomotives Owne

The Morris County Crushed Stone Co. of Morristown and its subsidiaries are one of the biggest producers of stone in the country.

In 1915 Mr. F. W. Schmidt, President (who is also Pr of the National Crushed Stone Association), bought the Plymouth Locomotive. Repeat orders followed until n Plymouths take care of their haulage burden.

Read the letter in adjoining panel—then write us YOUR haulage problem and we will send you inte literature.

The Fate-Root-Heath Co., Plymouth,

Morris County Crushed Stone Co.

MORRIS COUNTY CRUSHED STONE CO.
MORRISTOWN, N. J.

Millington, N. J., June 27, 1923.

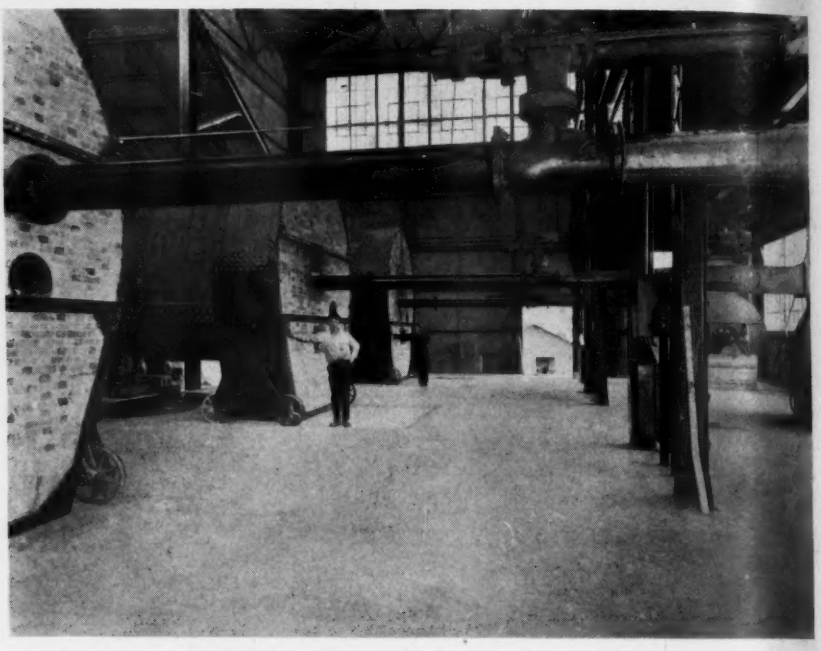
The Fate-Root-Heath Co.,
Plymouth, Ohio.
Gentlemen:

We still have in operation the first Locomotive we purchased from you in 1915. This Locomotive is still doing its bit, which speaks pretty well for your machines.

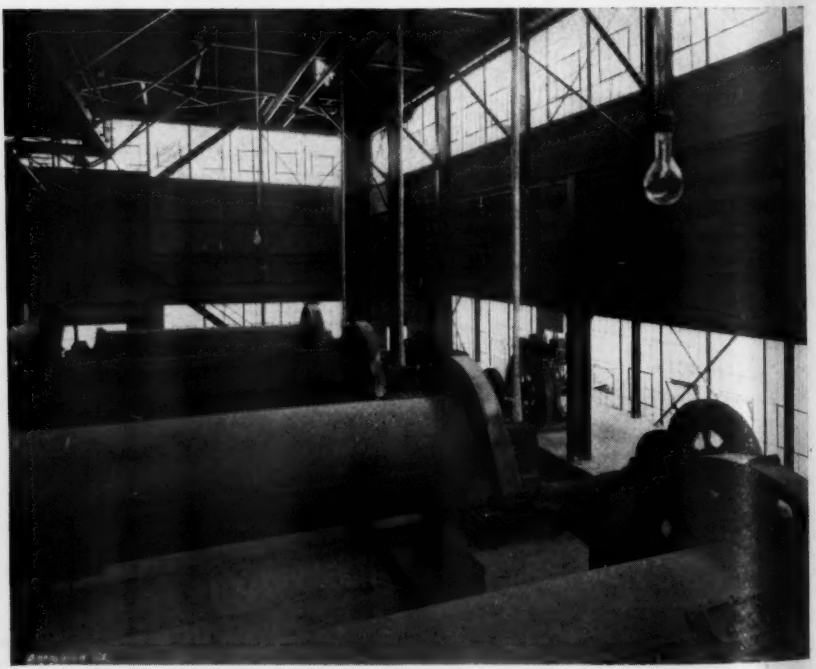
One of the principal reasons we use your Gasoline Locomotives is because the average youth can be taught to run them efficiently in a very short time, whereas with the Steam type it is necessary to employ a licensed engineer. Gasoline Locomotives are also much more flexible than Steam in quarry operations.

Another reason is the comparative low initial cost and the slow depreciation.

Yours very truly,
MORRIS COUNTY CRUSHED STONE CO.,
By F. W. Schmidt, Jr.,
Superintendent.



Showing three of the 10x150 Vulcan kilns.



These four 7x26 Traylor tube mills do the fine grinding.

New Phoenix Portland Cement Plant at Birmingham

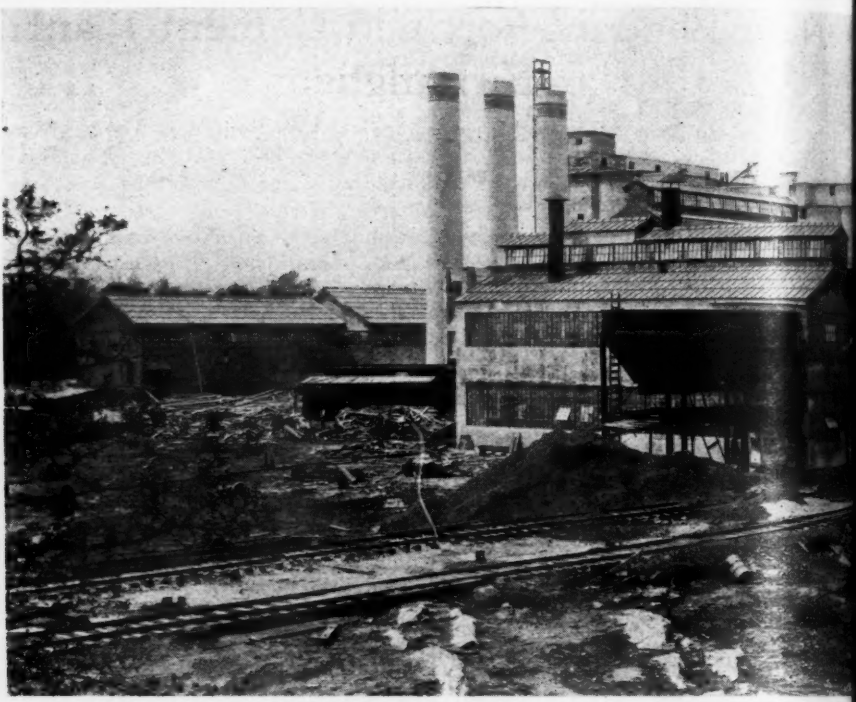
In October of last year, work was begun on Plant Number 2 of the Phoenix Portland Cement Co. at North Birmingham, Ala. Two months ago that plant produced clinker, and three weeks after the production of the clinker was turning out finished cement; surely a construction record of which the Phoenix Co. can well be proud. The plant is now close to the production of its full capacity of 5000 barrels a day.

The new operation is a "dry" plant. By the employment of the dry method manufacturers hope not only to accomplish the assured saving in fuel that comes with this method, but to produce a product that for uniformity of analysis will be equal to any cement that has ever been produced by the wet method.

The mill buildings are modern in every way and embody the best and most improved features of present day construction. All buildings are constructed of steel and reinforced concrete, with roofs of cement tile. Ample space has been left for storage purposes and the installation of handling facilities. Other general observations on the plant are that it is operated entirely by electricity, that each piece of machinery is, as far as possible, driven by a separate motor, that units are operated individually and driven so as to be independent of other units. Another desirable feature of the plant is its closeness to good transportation. It is situated at North Birmingham, on the main line of the Louisville and Nashville Railroad and connects to the Belt Railroad with all the trunk lines entering Birmingham. It is close enough to Birmingham to be able to draw upon that city for its labor supply. The plant is only a half mile beyond the city limits and 5 miles from the business section of Birmingham.

Close by the mill is the limestone deposit, from which is secured stone of uniform composition and with an analysis that makes it a very desirable cement material. There is hardly any overburden to be disposed of, and this feature will, to an extent, reduce the cost of stone production. At the present time, a 40 foot face is being maintained in the quarry. From this 40 feet is secured a stone that analyzes nigh in the limey constituents required in cement raw materials. Under this 40 feet of rock that analyzes high in lime is another stratum that extends down to a depth of 70 feet, and contains a natural cement rock, a stone practically identical in composition with the cement rock found in the Lehigh district of Pennsylvania. The stone from the higher level will, of course, require the addition of clayey materials to make a cement mix. The clayey materials will be supplied in the form of shales secured from nearby deposits. The Phoenix Company is thus well off for raw materials.

At the present time quarry operations are being carried ahead at a rapid rate. Drilling is being done by two Cyclone well drills made by the Sanderson-Cyclone Co. of Orrville, O. Ingersoll-Rand No. X70 drills are being employed while the work of opening up the quarry is being done. Just about all the blasting will be done in holes drilled by the well drills after the quarry has been opened. The formation makes the use of this equipment the most profitable and generally desirable. Blasted material will be picked up by 2 No. 30 Marion crawler type full revolving shovels electrically operated. By means of these shovels broken rock is loaded into 8 ton cars

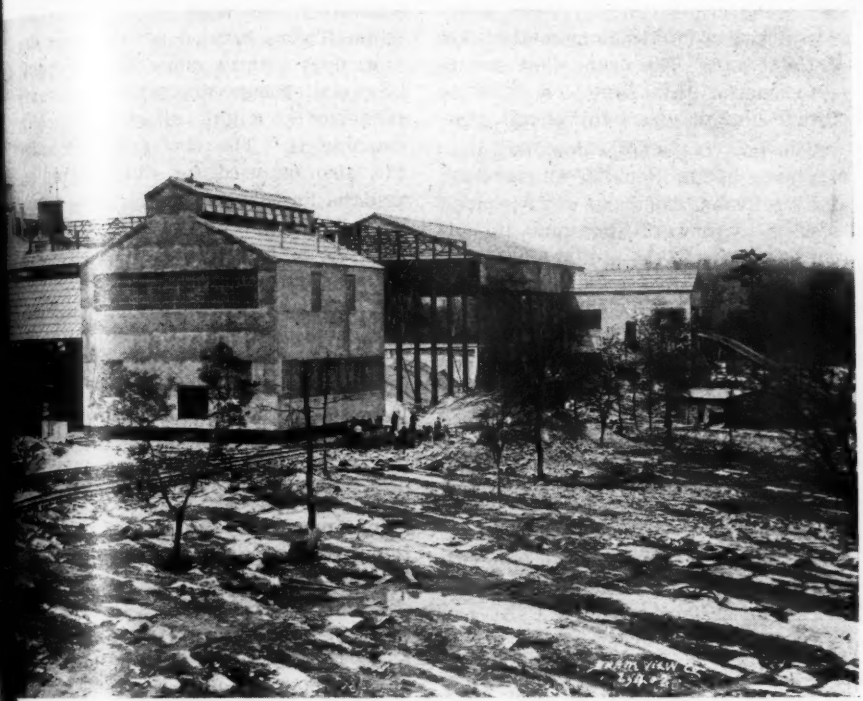


This is how the Phoenix plant loo

of all-steel construction, built for 32 inch gauge. These cars are products of the Eastern Car & Construction Co. of Easton, Pa. Cars are handled by a General Electric storage battery locomotive and by a 15 ton Davenport steam locomotive.

Loaded dump cars are pulled to the ground level along an inclined trackway by a drum hoist manufactured by the S. Flory Manufacturing Co., Bangor, Pa. A 100 horsepower General Electric motor of slipring type is used to power this hoist.

When the rock reaches the crusher house it is dumped from the side of the cars by means of a hoist and cable operating a hook that tips the car sideways. The rock falls to a 36 inch Superior crusher made by the Worthington Pumps and Machinery Corporation of New York City. After the rock is acted upon by the crusher it is discharged at the bottom of this machine and is picked up by a 42 inch Link Belt Conveyor. This conveyor carries it to a hammer mill made by the Pennsylvania Crusher Company of Philadelphia. Material passed by the hammer mill is sent by a chute directly to one of a number of covered storage pits over which runs the tracks of a traveling electric crane. Two 8 ton cranes furnished by the Champion Engineering Company of Columbus, Ohio, are mounted on the craneway which has a span of 80 feet and a length of 400 feet. The craneway runs over all the pits, the two cranes dividing up the work by handling what is to be done at either end or working together near the same point. The cranes are equipped with 3 yard clam shell buckets which pick up the crushed material and pass it direct to



short time before it was completed

the weigh or mixing bins which are located on the other side of the plant.

The limestone is thus quickly prepared for mixing with shale and going through the raw grinding process. The shale, too, is procured and processed without particular difficulty. It is quarried about a mile from the plant, at Lewisburg, Ala. from a large deposit of this material which has characteristics that make it very desirable from the cement maker's point of view. One of these characteristics is that the deposit contains both high silica shale and low silica shale. By varying the proportions of high and low silica shale the manufacturers get a material that fits in most conveniently when making the mixture with limestone. Quarrying at Lewisburg is simplified by reason of the fact that there is no overburden.

The crushing of the shale is done at the pit by a 13 inch gyratory crusher and by rolls. This equipment is furnished by the Traylor Engineering and Manufacturing Company of Allentown, Pa. After reduction the shale is passed by elevators and belt conveyors to reinforced concrete storage bins of 200 tons capacity. These bins are elevated on concrete pillars and underneath them run the loading tracks along which standard gauge equipment owned by the company is drawn for overhead loading. The railroad connecting the shale pit and the mill is owned by a railroad company and only the equipment in which the shale is carried is the property of the Phoenix Company.

Arriving at the mill, the shale cars are run on tracks paralleling one side of the storage bins. The cars dump through hopper bottoms into a hopper pit which conducts the shale to a point

inside the crane runway, from where it is picked up by the clam shell bucket of the crane. The crane then passes it to one of three 800 ton concrete storage bins or direct to the mix bins.

A 36 inch Schaffer poidometer, manufactured by the Schaffer Engineering and Equipment Company of Pittsburgh is used to forward limestone in correct quantities to the mixing operation. A 20 inch Schaffer poidometer passes ahead the shale. The flars from these two continuous weighing devices come together at a 24 inch pan conveyor made by the Link-Belt Company of Chicago. The function of this last piece of equipment is to elevate and convey the cement making material, now weighed out in correct proportions to the drying operation.

Drying is done in two 7x70 foot vulcan dryers, made by the Vulcan Iron Works of Wilkesbarre, Pa. At the feed end of each dryer precaution is taken, after the material has been introduced to settle out all dust, thus reclaiming valuable material which would otherwise, by getting into the air, become an annoyance. It may be said in passing that the Phoenix Company has spent over $100,000 to insure as much as possible against a dusty condition in the plant as a result of chimney discharges. The reclamation of dust in the driers is done by large reinforced concrete dust chambers, lined with fire brick which were designed and constructed by the companys construction force.

The dryers are fired by pulverized coal blown to the machines from the coal crushing plant in somewhat the same manner as that in which coal is supplied for the kilns.

After the drying operation has been completed the mixed limestone and shale is ready for the raw grind. The machines for the raw grind and the finish grind are all located in the same building. Each of the processes, the raw and the finish grind, has four separately operated and controlled units. Thus a break-down in one of the units does nothing more than to slightly curtail production, where other arrangements might mean practically stopping it. The raw grinding units can also be used for finish grinding and the finish grinding for raw grinding. Preliminary grinding is done by four gear driven Bradley Hercules mills, products of the Bradley Pulverizer Company of Allentown, Pa. Flexible couplings connect these mills directly to 300 horsepower General Electric motors of the slip ring type.

The total grinding capacity of the raw and finish grind machinery is 12,000 barrels per day. An advantage of being able to use the raw and finish grind machinery interchangeably is that it is thus made possible to put in the full effort at the work that is most necessary at the time, whether that be to prepare material before or after it has been in the kiln. A double system of conveying machinery makes it possible to divert the material flow quickly from the regular channel and route it in the direction where the greatest advantage is secured.

After the preliminary raw grinding has been done in the Bradley Mills the material goes to 7x26 foot tube mills manufactured by the Taylor Engineering and Manufacturing Company of Allentown, Pa. Each of these mills is charged with 55 tons of 1¼ inch Cylpebs and is driven through a 60 inch magnetic clutch by a 500 horsepower General Electric synchronous motor. The magnetic clutch is a product of the Cutler-Hammer Company of Milwaukee, Wis.

After the raw material has been ground to the required fineness it is carried over to the blending silos, five reinforced concrete storage bins of 2000 barrels capacity each. These silos are 65 feet in height and 17 feet in diameter. The reason for their being called blending silos will be seen later.

These structures are parallel to the grinding units and are close to the mill building. They were designed and built by the McDonald Engineering Company, who specialize in the solution of storage problems around cement plants.

At the bottom of each of these silos is a Link-Belt rotary feeder which, governed by a control that is operated at variable speeds, will give any desired amount of material from any particular bin. It is thus possible to draw off materials with an eye to their various analyses, to mix the contents of the various bins in just the proportions desired. The chemical properties of the contents of the several bins are, of course, determined by analysis at frequent intervals.

The kilns, products of the Vulcan Iron Works of Wilkesbarre, Pa., are 150 feet long and 10 feet in diameter. They are fed by screw conveyors and fired with pulverized coal. Drive is by individual motors and each kiln is also equipped with a fan which runs from an individual motor.

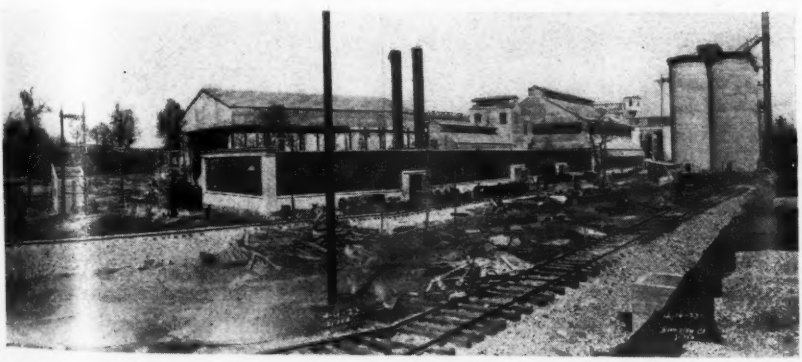
After the calcination process has been completed and the clinker carried to the low end of the kiln it is dropped upon a pan conveyor which discharges at the craneway pits. From here it may be transported through a 24 inch pan conveyor to a 15x15 foot concrete hopper or may be stored for future use.

The clinker is then passed to the finish grinding operation, either directly or by way of the storage. The finish grind is conducted as previously described under the subject of raw grinding. The preliminary work is done by Bradley Hercules mills and the final reduction by Taylor tube mills.

After the finish grinding department has produced the ground cement, this product is carried to the 6 reinforced concrete cement silos which, with the two interspaces created by the two rows of three bins, give a total storage capacity of 110,000 barrels. These silos are 84 feet in height and 32 feet in diameter.

Beside the silos is the packing house. Here 4 Bates packers, made by the Bates Valve Bag Company, are supplied from the silos with cement for bagging. Along two sides of the packing house run belt conveyors which carry the bags of cement directly to cars on the loading tracks. Loading track facilities are sufficient to accomodate 60 loaded and 60 empty cars.

A 198x48 foot bag house is located beside the packing house. Ample space is thus provided for the repair, cleaning and storage of a large supply of bags. Close to the packing house is also a 25x60 foot trucking station in which may be stored sufficient bagged cement to take care of the local truck trade without interfering with the loading of bags into cars.



Showing machine shop, stone storage, dryer building, mill building and finish silos

Link-Belt silent chain drives, manufactured by the Link-Belt Company of Philadelphia, are used throughout the plant on the individual motors driving elevators, conveyors, dryers and kilns. The crusher furnishes the only example around the plant of a machine driven by a belt. Everything else is powered through Link-Belt drives or is directly connected to its motor.

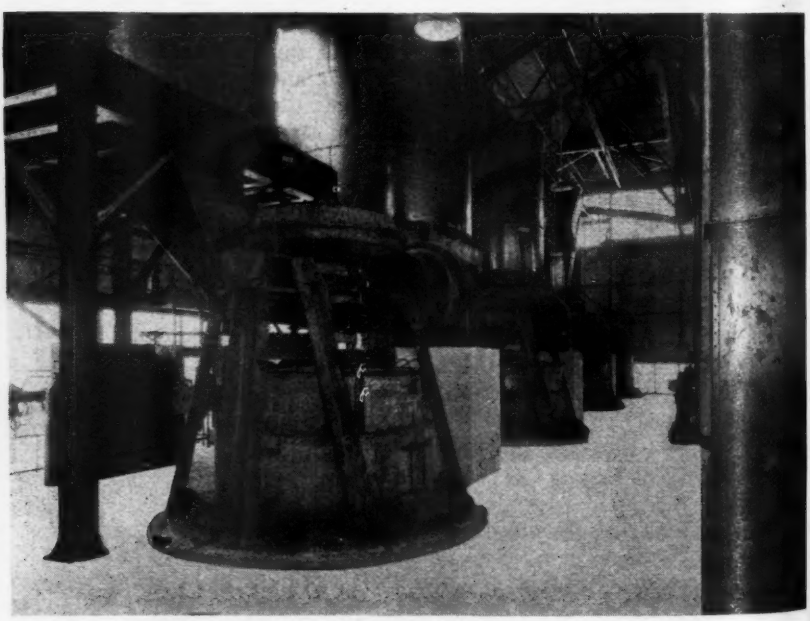
Two Ingersoll-Rand air compressors furnish air under pressure for various purposes around the mill and quarry operations. One of these compressors, delivering 620 cubic feet, will be relied upon to do most of the work. The other, with a 320 cubic foot capacity, will serve as a standby.

Air will be used to pump the coal for the kilns and dryers. The Fuller-Kenyon system of pumping coal has been installed. The coal is reduced to a pulverized condition by three 42 inch gear driven Fuller mills supplied by the Fuller-Lehigh Company of Fullerton, Pa. The coal grinding department is located in a separate building.

In another building, 50x260 feet, are located the switchboard and storeroom, together with the blacksmith and machine shops. In another building, the same that houses the air compressors, are the transformers, which steps part of the current down to 2300 volts and part down to 440 volts. In the switboard room are 2 General Electric rotary converters which supply the direct current for the kiln motors, magnetic clutches and electric cranes.

An interesting feature of the plant is the method of equipping the feed end of each kiln with a large chamber which settles and reclaims all the dust. Each is 70 feet long, 30 feet wide and 40 feet high and is built of reinforced concrete lined with fire brick. The chambers have hopper bottoms under which are screw conveyors to carry the dust back to the raw silos.

The 3 reinforced concrete kiln stacks, 103 feet in height and 8 feet in diameter, were built by the Weber Chimney Company, of Chicago.



Four Bradley Hercules mills, used for preliminary grinding

The kiln dust chambers were designed by the Rust Engineering Company of Birmingham and were erected by them. The Austin Company of Cleveland, Ohio, erected the machine shop building. The Merrick Scale Co., of Passaic, N. J., furnished weightometers. The roofing came from the American Cement Tile Company of Pittsburgh. The Walsh and Weidner Boiler Company of Chattanooga built and erected the storage bins. While construction was going on a 15 ton locomotive crane made by the Orton and Steinbrenner Company of Chicago was used for a variety of purposes. This piece of equipment will now be utilized chiefly for transferring coal from the cars to storage bins at the coal grinding plant.

Blasting in Crushers

IN a large number of quarries where the largest types of primary crushers are used, it is a practice, when a large boulder chokes the crusher, to use dynamite either to break up the boulder or to dislodge it so that the crusher will take a bite upon it and thus break it up and pass it through. This is generally a quick method of disposing of the boulder and it is often the means of saving much time and keeping the crusher up to the standard of production.

The charge used is generally small, seldom exceeding over a pound of dynamite, and in many cases is less. Such blasting may be done only a few times a week, while in some cases charges may have to be put off hourly, depending of course upon how large the boulders are and the way in which they enter the crusher.

There are but two alternatives to this method of blasting. One is the use of levers or bars to pry up the rock and put it in such a position that the crusher will break it. The other is to use sledges to break the rock, or at least break off some points. Both of these methods are generally slow. But they have one advantage over that of blasting and that is that there is no great danger of injuring the crusher.

The practice of blasting in the crusher is to be generally condemned. There is always a slight danger that workmen will be injured by pieces of rock flying from the blast, and there is always danger of injuring the crusher. Even if the crusher is not actually broken, yet the excessive jar or concussion, due to the blast, does not do the crusher any good, and in course of time will weaken it.

In large gyratory crushers concaves can be cracked due to the breaking of the boulders by the blast. These concaves may not be so injured as to fall out or have to be replaced immediately, but if continual blasting is done, many of the concaves will have to be renewed. Heads can also be broken and even spiders. In large jaw crushers the chances of injury are not so great. But, even in such crushers, some damage can be done.

It is hardly to be expected that those operators who are now using this method of blasting will cease to do so at a word of warning. It seems advisable to call attention to the practice, so that those who are not doing it may not begin, and that those who are following it will try other means of dislodging boulders in some cases.

The Clinton Sand and Gravel Co., Clinton, Ill., has been incorporated with a capital of $10,000. The company expects to produce sand and gravel on a large scale, and with the possibilities of road construction in that vicinity for the next several years, it is assured that there will be no limit to market demands.

The Pekin-Springfield Gravel Company, Pekin, Ill., has just begun operations. The plant will fill 75 cars of gravel in an 8 hour day and the amount of orders now on hand will keep them running at high speed for several weeks.

Good Call for Material

Prices Firm With No Evidence of Immediate Change

(By Our Pittsburgh Correspondent)

The advent of real summer weather shows no marked change in sand and gravel operations in the Pittsburgh, Pa., district. The producers are active on the rivers and there is a healthy call for material. Not only is there good local buying, but different river points occupied by the various iron, steel and affiliated industries are showing up well in the line of current production and distribution, and heavy hauls are being made.

Prices are firm and give no evidence of any immediate change. The high cost of production is a matter of established fact that the producers must meet, and there is certainly no trend to lower wage scales. Best washed gravel is finding a good volume of takers at the waterfront at $2.00 a cubic yard. The price on the float holds at $1.60, while deliveries are being made at a proportionate higher rate, depending upon the destination.

First grade river sand maintains at $1.00 and $1.10 f.o.b. float, with dock deliveries quoted at $1.50. Large quantities of material are now being distributed throughout the city and nearby points and there is not much opportunity for any great accumulation of stocks.

Local supply dealers are also finding a ready sale, with gravel, retail, at $2.50 a cubic yard and upwards, and sand at close to the same figure. There is no hesitancy in stocking up at the prevailing wholesale levels. Portland cement is in good demand at the supply yards, with price at $3.50 a barrel, less bag credit of 10 cents each. Wholesale, cement is bringing $2.24 a barrel.

J. K. Davison & Brothers have had six new barges constructed at the works of the American Bridge Co. Two of these recently were launched and the other four will be ready at an early date. The floats will be placed in service immediately to handle the output of the sand diggers on the Allegheny River. The company is keeping its entire fleet in service and will continue on this basis for an indefinite period.

The West Virginia Sand & Gravel Co., Charleston, W. Va., has been running into a little ill-luck recently with its river steamers. Several weeks ago, the "Mary Jane" sunk in the Big Kanawha River, and the company called on the Pittsburgh market, chartering the steamer, "Robert Jenkins," of the National Transportation Co., to replace the lost vessel for towing sand and gravel from points on the Ohio River to Charleston. Early in July, the last noted steamer went hard aground near Point Pleasant, but without serious consequences. The steamer "Mary Jane" is being raised and will be taken to the docks for rebuilding. The company is maintaining activities at a high point.

The Keystone Sand & Supply Co., has recently opened its new plant at Munhall on the Monongahela River, and is now making shipments by rail from this point. The new plant is expected to facilitate operations to a considerable extent and will be kept in active service. The entire floating equipment of the company is busy on the river and large loads of sand and gravel are reaching the local market. The company has the dredge "Frankfort" busy at Freedom, where a new harbor is being dredged.

The Iron City Sand Co., finds business keeping its full fleet in service, and the steamer "P. M. Pfeil," has been hauling heavy floats of sand and gravel for distribution. Equipment that has been laid up for repairs recently is now ready and will be placed in operation.

The steamer, "Atha" of the Crucible Fuel Co., has been taken to the marine ways at Elizabeth, where the steel hull will be scraped and painted, and the vessel otherwise placed in first class shape. This company has been very active with its fleet on the river.

The Lincoln Sand and Gravel Co., Springfield, Ill., must bear the entire expense of the construction and maintenance of an interlocking plant at the crossing of the single track of the Illinois Traction System at the company's plant near Lincoln, according to an order handed down by the Illinois Commerce Commission July 5.

The Atlas Rock Co. has just been incorporated at Oakdale, Calif. with a capital of $150,000. Machinery ordered from the east will make possible a minimum output of 40 tons daily.

Is Standardization Enough?

By WILLIAM GANSCHOW,

President William Ganschow Company

We are all familiar with the efforts that have been made in the past few years by engineering societies, manufacturers' associations, and even the United States Government, toward the standardization of numerous common items to manufacture.

That standardization is the solution of a great many troubles, and the only method of eliminating great amounts of expensive dies, tools and machinery, is no longer questioned; *but is standardization enough?*

A great percentage of the users of mechanical equipment, while expert in its use, are entirely unacquainted with the terms to be used in specifying duplication of many of its parts. How many operators of a steam dredge, a coal elevator, or electric pump—or any other machinery—could state correctly the necessary data to obtain the replacement of, say, a gear? How many operators could specify pitch, diameter, shape of teeth, etc.?

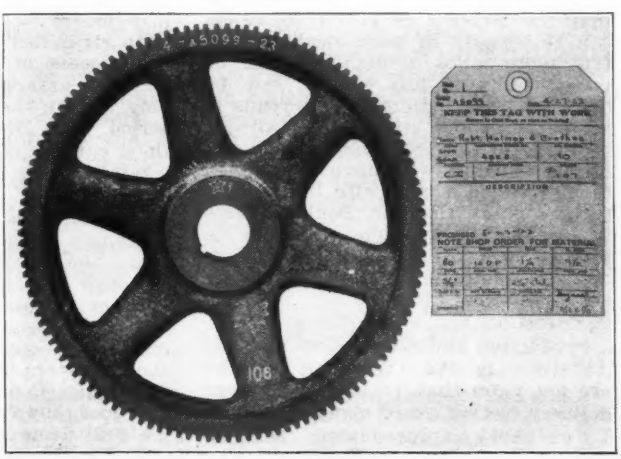
To be sure, they should be able to refer all their troubles to the builders of the machine, but the practice which is growing constantly more universal, of buying such parts as gears, clutches, pulleys, governors, speed transformers, etc., from other manufacturers, has not only resulted in the use of many different types of "accessory" equipment, but has confused the builders' records—if such records are kept.

We are all familiar with the markings on "Byers" pipe, showing size and date of manufacture. In the automotive field, it is comparatively simple to obtain replacement parts by the use of model numbers. Other equipment, such as pumping machinery, carries serial numbers which refer to a particular specification on file with the maker. There are, however, many kinds of commonly used articles which are more or less difficult to specify correctly and which are perhaps most often purchased "outside" by the builders of machinery units. Gears are perhaps the most commonly used and the least understood by the average operator, and few gears are now marked intelligibly so that replacement parts may be ordered with real assurance of correctness.

Realizing from past experience, that the marking of gears meant the elimination of a great deal of trouble, the William Ganschow Company, pioneers in the cut gear field, have adopted the practice of marking on each gear not only their trade mark, but also a production number upon which the gear was manufactured and the date of its manufacture. (See illustration).

Aside from the convenience which such marking affords in re-ordering, it has the effect of inspiring confidence in the manufacturer; first, because it shows that he has confidence enough in his product so that he is willing to put his trade mark upon it; and, secondly, it shows that he has faith enough in its durability to invite the comparison of its length of life with that of similar articles, affording the user an accurate means of checking its period of use from the dating which it carries.

The William Ganschow Company, always alert to anything that will impress the quality of their material upon the user, have adopted this method of marking, knowing full well that unless it is to be derogatory to their established reputation, each gear must maintain the Ganschow reputation for quality.



Reorganize Department

New Ohio Highway Director Assumes Charge

By Our Cincinnati Correspondent

The Ohio State Highway Department under direction of its new director, Louis A. Boulay, recently appointed by Governor A. V. Donahey to succeed Leon C. Herrick, is undergoing a reorganization this summer which includes a number of innovations in plans and procedures. Mr. Boulay is a big, square shouldered engineer, and hopes above all things to leave a real impress upon the highway situation in Ohio. As has been often published, the Highway Department of Ohio for a number of years has furnished fuel for many political fracases, and Director Boulay believes that troubles in his department will be obviated by less secrecy in highway matters in the future. To disarm suspicion in Ohio road work the new director plans to keep material men, contractors and engineers, informed on all new developments of construction. One of his largest tasks is the reformation of the maintenance end of highway work. This is a policy dear to the heart of Governor Donahey. The Governor has believed that in many instances more cheaply constructed highways purposely have been neglected to disgust the public with anything but the most expensive construction.

Mr. Boulay himself is not a general cheap roads advocate. He believes that the benefits of better highways can be brought to more localities and that more miles of highways can be constructed for less money, but he does not favor building cheap roads in all parts of the state. It is alleged by many of the producers of road materials in Ohio, who have proclaimed themselves in accord with the new director's plans, that Mr. Boulay's ideas in his road programme will seek to give all road interests an even chance and as equitable a division of the state's appropriation as any past administration has ever offered.

Production and distribution of basic materials in the Cincinnati district are not more than regular, a summer dullness having set in many instances. The past unprecedented building boom reached its peak some weeks ago, and building progress has somewhat retarded. Local roadwork is at a standstill, except in sporadic instances of contracts calling for repairs. Prices are most favorable and conducive to all construction work, and it is evident that labor scales and other contributing causes are lessening current building programmes.

Prices on materials continue as from last month. Washed gravel sells at $1.50 a ton f. o. b. cars, sand, $1.20 f. o. b. cars, cement $2.99 a barrel; and lime is quoted at the market price of $16.80 a ton. Adequate supplies of all materials are at hand, although with the present price scale there is no hesitancy in buying.

J. Cornell, manager of the Red Bank Gravel Company continues to operate their three plants daily. The Red Bank Gravel Company has been fortunate to secure the bulk of the contracts calling for materials used in the city concrete roads under construction in a few of the outlying districts. The company is digging a good grade of sand, and has made a number of improvements recently. One of their operations is employing a new Erie Type B steam shovel, and has changed to a three inch electric pump. A well has been sunk near one of the pits, and the concern has changed over to the new water supply, cutting down the overhead in the former use of purchased city water.

F. E. Hall, head of the T. J. Hall Co. reports that the company's production of river sand the past thirty days has been about the same as the total of last month. The low stage of the Ohio river has contributed largely to the success of the latest production. Mr. Hall asserts that prices will probably remain the same for the coming period, and adds that in all events they cannot possibly drop to lower levels.

The Dugan Concrete Company of Cincinnati is anticipating a big spurt beginning in the fall. Mr. Dugan continues the full programme of diggings, although the more or less dormant summer demand is present. The efficiency of the plant having been increased by means of the new hoists and conveyors installed the fast spring, the Dugan Concrete Company is storing good supplies in preparation for the Fall demand.

Study of Western Fluorspar Deposits

Results of an examination of the various Western fluorspar deposits made by R. B. Ladoo, mineral technologist of the Department of the Interior, are set forth as follows in Serial 2480, just issued by the Bureau of Mines:

With one exception, all of the deposits worked have been so small, or so far from transportation, or contain fluorspar so mixed with silica or barite or both, that profitable production of gravel grade of fluorspar, acceptable to eastern steel mills under present standards, has been impossible, and the future seems no more promising. There are two small mines which would yield a few hundred tons annually by screening hand-picked ore, but from present indications, these properties do not justify the erection of mills.

With only one exception, the most accessible ore from the mines which have been worked has been removed. The mines are for the most part, in poor physical condition, and future operations will be increasingly difficult and expensive.

Most of the western mines have long and expensive hauls to railroad, and the ore bodies are too small to justify the cost of installing improved methods of transportation, or modern mining and milling equipment.

The production of acid fluorspar west of the Mississippi River from ore bodies now known probably will not exceed 100 tons annually. It is believed that not over 3,000 tons of ground fluorspar can be annually produced, of which one-third will be low grade.

It was estimated that the properties visited in the western states can produce for a few years a maximum of 13,000 tons annually of a grade of gravel analyzing on an average 5 per cent or higher in barite, and a maximum of 4,000 tons of fluxing lump. The western steel mills, on account of the difficulty of obtaining fluorspar in gravel form, have been accustomed to use in their open-hearth furnaces both lump and gravel. The estimated consumption of the western mills is 10,000 tons annually, and they will probably continue to utilize western fluorspar on account of the high freight rates applicable to the Illinois-Kentucky product.

U. S. G. Breaks Record

First Half of 1923 Was Best Period in History

In sales, earnings and tonnage the United States Gypsum Company for the first six months of the current year has exceeded all previous records in its history, according to S. L. Avery, president.

Mr. Avery was optimistic. The plants of the company are operating at capacity and the outlook is good.

"It is the conviction of our sales department that sales will continue at their present rate for at least the remainder of this year, and from indications now they may run higher and beyond that period."

"The farmer," continued Mr. Avery, "is slowly getting back on his feet. Our sales in the South and Southwest are good with the exception of the Northwest. That territory, due to severe competition and the conditions of the farmer is the only soft spot in our organization. Still the farmer there is slowly improving."

The semi-annual earnings probably will be announced on or after August 1 following a meeting of directors.

Talc Mine Should Have Adequate Reserves

For the successful operation of a talc mine enough prospecting should be done before a mine is opened or a mill built to prove a large tonnage of talc of marketable grade, states R. B. Ladoo, mineral technologist, Department of the Interior, in Bulletin 213 of the Bureau of Mines. Probably 200,000 tons is a minimum safe reserve on which to start operations; 500,000 tons would be much better. Unfortunately, few companies in the past have done, adequate prospecting; after some mills were built not enough talc was available to keep them running. When a definite tonnage has been blocked out and a mine opened, it is equally important that prospecting and development be continued so that a large supply of ore may always be blocked out in advance of actual mining.

The Threewit-Cooper Cement Co., Denver, Colo., has been incorporated with a capital stock of $50,000.

Lower Freight Rates

Believe I. C. C. Will Arrange for Downward Revision

By Our Washington Correspondent

Those persons in Washington close to the administration believe that freight rates throughout the United States are destined for further consideration and possible downward revision by the Interstate Commerce Commission. Indications are that the subject will come before the commission for discussion within the next month or six weeks. No formal announcement of whatever plans the commission may have has been made and none is likely until some definite action is taken. Moreover, the commission, cognizant of the greatly improved condition of the carriers as a whole, of the unusual volume of business handled at the present time and during the past few months, and of the excess earnings of a considerable number of the stronger roads, is carefully studying the entire rate fabric as a preliminary to deciding what proceedings should be inaugurated to revise rates. The preliminary study may result in no action whatever. On the other hand, it holds the possibility of resulting in another—and probably small—reduction in rates generally. The difficulty, however, in the situation is that such a reduction would apply to the weaker roads as well as the strong. If it were simply a question of fixing rates on the basis of the earnings of some of the big roads, there is little doubt that a reduction would be ordered now. If such a general reduction is made sand, gravel, stone and other building materials probably will be included.

Rates on cement shipments moving entirely within Illinois and within Indiana were declared by the Interstate Commerce Commission to be unduly preferential to producers in those states and to constitute a discrimination against shippers in Hannibal and St. Louis, Mo. Railroads were ordered to file new schedules by October 12 carrying rates no greater on interstate shipments than are charged on shipments within the states for equal distances. The commission also found that cement manufacturers at Hannibal and St. Louis, Mo., and Buffington, Ind., were entitled to slight rate reductions in shipments to Illinois points, while manufacturers at Hannibal also were held to be entitled to similar reduction on shipments to Indiana points, and the railroads were ordered to make the prescribed changes. The new rates must be based on distance, the commission said, and be not in excess of 7 cents per hundred pounds for distances of 20 miles, ranging up to a maximum of 21½ cents for distances of 700 miles.

Definite designations of roads to comprise the Federal-aid high system have been made in 34 states by the Department of Agriculture. These roads, and estimates in the 14 states where roads have not yet been approved, aggregate 187,406 miles, connecting nearly every city in the country having a population of 5,000 or more. Indications are that more than 90 per cent of the nation's population will live within 10 miles of a Federal-aid highway. In some states it will be as high as 98 per cent, according to department officials, and in none will it drop below 65 per cent. Mileage by states where designations have been made is: Arizona, 1,498; California, 4,467; Colorado, 3,360; Connecticut, 835; Delaware, 266; Florida, 1,855; Idaho, 2,772; Indiana, 3,957; Iowa, 7,154; Kansas, 6,423; Kentucky, 3,250; Maine, 1,393; Maryland, 1,036; Michigan, 4,582; Minnesota, 6,801; Missouri, 7,040; Montana, 4,697; Nebraska, 5,500; Nevada, 1,456; New Hampshire, 988; New Jersey, 983; New Mexico, 3,358; New York, 4,498; North Carolina, 3,816; Ohio, 4,506; Oregon, 2,814; Pennsylvania, 3,954; Rhode Island, 165; Utah, 1,430; Vermont, 1,043; Virginia, 3,016; Washington, 2,887; West Virginia, 1,901; Wyoming, 3,234. Estimated mileage in states where designations have not yet been approved is: Alabama, 3,958; Arkansas, 5,037; Georgia, 5,662; Illinois, 4,987; Louisiana, 2,667; Massachusetts, 1,290; Mississippi, 3,290; North Dakota, 4,855; Oklahoma, 7,889; South Carolina, 3,179; South Dakota, 8,077; Tennessee, 4,564; Texas, 11,655; Wisconsin, 5,516.

Surplus war material which the Government refused to sell at junk prices is being used in road construction to great advantage by the states to whom the material is transferred, according to the Bureau of Public Roads. At the end of the war there was left unused over a half-million pounds of rough castings of spare parts for one of the well-known makes of motor trucks. They were badly

rusted and on casual inspection might have been condemned as worthless junk, but it was found that the necessary machine finishing entirely removed all rust and pits. A small offer for the entire lot was made but was not accepted. A few months ago the State Highway Department of North Carolina accepted a portion of them as part of its share of surplus war material for use in road building. Surplus war machinery was used for finishing the parts for use in trucks also received as surplus war material. The finished parts are worth about 75 cents a pound as compared with an offer of 1 cent a pound for the parts in rough. Other states have followed the example of North Carolina and the entire supply has been taken up and will be put to useful service.

The Policy of Repairing Machinery

Machinery used in pit and quarry operations has very severe handling and is required to do gruelling work. The result of this is that there are many break-downs, and repairs must be frequently made. Break-downs on such machinery are not only expensive, dut to the cost of the extra parts and of the labor, but also to the fact that the entire operation may be held up for hours, and sometimes days. It is thus imperative that accidental breaks be prevented as far as possible, all of which brings up the subject of the policy of making repairs.

In doing this work every operation should have some kind of a shop. The extent of the operation must guide those in charge as to the kind and size of shop needed. In every case, though there must be some wood working machinery and tools, a well equipped blacksmith shop, and a machine shop. There must also be kept on hand a kit of tools that can be carried from shop to those machines that must be repaired in place. It must be understood that a few hundred dollars, or even a few thousand dollars so invested can quickly pay dividends by making it possible to accomplish quick repairs. When large gangs of men are idle for a few hours, or put on work that does not mean production in order to keep them busy while repairs are being made, it is a great loss of payroll money. If this waste is reduced by having facilities for making quick repairs the money so invested would prove good business.

Quite recently the writer saw an entire quarry force idle, or doing but little work throughout the day because of the fact that there was not an acetylene torch on hand. The money lost that day would have paid for an entire outfit. This is true in too many cases, and it shows the importance not only of having the proper tool for making repairs, but also for making these repairs promptly.

There can be two general policies in making machinery repairs. One is to make such repairs as may be absolutely necessary, consuming as little time as possible in the work. This method is one that does not anticipate any accidents. At the same time, unknowingly to the operators, it is a frequent cause of the accidents that are not expected.

The other policy provides not only for taking care of break-downs as they happen, but of inspecting equipment from time to time to search out defects, find danger points, and have repairs made before the break-downs actually happen. This policy presumes a general overhauling of old plants from time to time. To pursue such a policy as this and maintain maximum output of the plants may mean having on hand not only spare parts of machines, but also some duplicate machines and equipment. While some of the equipment is in the shop spare parts of machines may be used in their stead and no time is wasted.

A large number of operators pursue the first policy for a variety of reasons. The chief of these is that it is often difficult to keep a master mechanic and a crew of men under him to make repairs. Another reason is that it requires additional capital to have on hand spare machines such as motors, cars, drills and like equipment ready to be used as substitutes during break-downs. Most business men like to operate on as small a capital as possible. A third reason against this policy is that there appears constantly on the books a large expense account both for material and labor for making such repairs—much larger than when only temporary repairs are made.

Those items are all readily shown on the books either as capital invested or as expense, and though they may appear large, they are frequently small as compared to those items of expense or loss which do not appear on the books. They run into thousands of

dollars. Such hidden expenses are those brought about by the loss of time, and the curtailments of sales.

These expenses or losses are most difficult to estimate, though they occur frequently and often add so much to the cost of production that a profit cannot be made. This is best illustrated by some examples from actual work.

A large quarry was originally equipped with machinery and equipment of good make. The machines were not only well built, but were properly designed for the work. Large production was attained, but for more than a decade only temporary repairs were made. Seemingly everything was in fair condition, but after a ten year period the production was only half of what it once had been, due to frequent break-downs. The repair bill was also exceedingly large. On one occasion a car that should have been repaired so that it would latch up properly was finally reduced to such a condition that it frequently dumped its load while in motion. This had happened a number of times without any serious results, but one day when the car accidently dumped as a result of its faulty mechanism, the dinkey hit one of the large rocks before the train could be stopped, breaking a cylinder, and was derailed so that the entire operation was held up for some hours while the wreck was being picked up and the dinkey taken to the shop to be repaired. This was a large item of real expense, yet only a small part of it actually appeared on the quarry books.

To continue the story, in the face of their previous experience the operators latched the car up and used it as it was for some days, when again a load was dumped and several cars were derailed. Thus a second wreck had to be picked up while the crusher was idle. This loss likewise did not appear on the books, yet the production fell greatly at a time when there was a great demand for stone.

In the same quarry several large steam shovels were worked. One had an armoured boom, the timbers of which became so worn and crushed that the boom did not work true. The same was true of the crowding engine. Still the shovel was kept at its work. Finally the crash came and it was necessary to buy a new boom. It was then found that the engines on the boom also had to be replaced, making a very expensive repair job. The old boom repaired promptly would have saved much of this expense, and the consequent loss attending the repairs.

In another case the cylinder of the Corliss type engine was so injured that a slight leak of steam showed. Still the engine kept going and doing its work. The operator promised himself that this would be repaired when a favorable occasion enabled him to do it. This was put off from day to day, until the leak became so bad that the engine would not furnish enough power to run the machinery. Then something had to be done, and there was an expensive repair bill and a cessation of production. This was due to that policy of only making emergency repairs.

In one large quarry, after some years of operation, where only temporary repairs had been made during the time of operation, it became necessary to rebuild the plant, and to buy some new equipment. In another case the greater part of the plant fell down, and it was necessary to spend thirty thousand dollars to rebuild it, consuming some months of time, while repairs could have been made for less than one fifth of this amount some years before.

Thus the two methods or policies of making repairs have been contrasted. The policy that the writer would recommend would be that of inspecting machinery at frequent intervals and of compelling all operators of machines to report at once any defect or any part of their machine that did not work smoothly. As soon as such reports are made any temporary repairs that are possible to be made should be attended to at once. In the case of more serious break-downs, as with cars or dinkeys, another should be substituted and permanent repairs made at the shop.

Idle time such as nights and Sundays should be used to make repairs to crushers and other machines that must be in constant use and to which substitution cannot be made. The fact is that at least once a week all machinery should be gone over, bolts and nuts tightened, bearings adjusted, grease cups cleaned out and packing renewed. If these things are done accidents will be prevented. It must be remembered that a machine is intended for use not abuse.

If a plant is not run during the winter an excellent opportunity is thus given to go over all the machinery completely and put it in first class condition. It is at this time that improvements should be made.

Heavy Cement Demand

Some Mills Have Hung Out "Help Wanted" Signs in Effort to Keep Up with Market

Cement mills in the Lehigh Valley section of Pennsylvania are keeping as close to maximum production as is possible and every effort is being made to have shipments of like order. The call for material is very heavy and has grown in volume to a point where some of the smaller mills are refusing to accept orders for anything like reasonable delivery. The demand is about equally divided between building construction and road work.

The labor situation is fairly satisfactory and while all available men are being pressed into service, there is no embarrassing shortage. A number of mills have the "Help Wanted" sign out, but are doing nicely with the present operating quotas. Wage schedules show no change and the recent advance seems to have effectually checked any dissatisfaction on the part of the men. Farmers in this section are out after more workers, but can hardly offer the hourly basis as now operative at the mills.

The railroads are succeeding in furnishing an ample supply of cars, of which the majority are finding their way to eastern destinations. The Ironton Railroad, which handles large quantities of material, is having some of the busiest months in its history. Motor trucks are still being used in large number for deliveries to Philadelphia, and other reasonably nearby points.

The different plants are making an effort to create reserve stocks for the months to come, a desire that has been current for some time past but which has been practically impossible up to the present time. A number of mills still have storage quarters bare, but under the present daily maximum output there is hope for an early allotment for this purpose. As the year matures, it is expected that the demand will slacken, allowing an opportunity to close down, where desired, for necessary machinery repairs. At the immediate moment, this seems next to impossible.

The Phoenix Portland Cement Co., Nazareth, Pa., is running full at its local mill, with close to normal working force. Sizable shipments are leaving the plant and incoming orders insure heavy production for months to come. The company has recently placed its new mill in the Birmingham, Ala., district in service, and expects to develop maximum output at this plant in the near future. It has a capacity of about 1,500,000 barrels a year, and is the first plant of its kind to be operated in the immediate vicinity of the city. The mill has beenin course of construction for a number of months past.

The Atlas Portland Cement Co., Northampton, Pa., is continuing production at its local plant, as well as at the branch mill at Coplay, in this same district. Large orders are on the books and no interruption in operations is anticipated for some time to come. The different plant units are employing close to their regular working quotas. The company is concluding negotiations for the purchase of the plant and business of the Western States Portland Cement Co., Independence, Kan. Upon acquisition, it is purposed to continue the operation of the mill as a branch plant. It is reported that the company contemplates extensions and improvements in the property to increase the present caypacity.

The Lehigh Portland Cement Co., Allentown, Pa., has advanced operations at its different mills and is developing maximum output at Ormrod and West Coplay. The Fogelsville mill is also active. The company has been forced to curtail production at its New Castle plant, owing to a restraining order secured by residents in this section, claiming that their property was being damaged by dust from the mill. The trouble is caused, it is stated, by a new type of waste heat consumer recently placed in service, and every effort is being made to eliminate the difficulty. It is expected to resume operations on a regular schedule at an early date. The mill has extensive orders on hand and delays in production at this season are extremely costly.

The Lawrence Portland Cement Co., is operating at its Northampton and Siegfried mills under a heavy schedule and large shipments are leaving the plants. The Whitehall Cement Mfg. Co., is active at its mill at Cementon, as is the Bath Portland Cement Co., at Bath. The Coplay Cement Mfg. Co., is running full at its Coplay mills.

The Universal Portland Cement Co., Universal, Pa., has take title to a tract of 231 acres of land in this section, including the site of its present mill and considerable adjoining propery, heretofore held by the Carnegie Steel Co. The valuation of the property as indicated by the deed is $3,462,500. Both companies are subsidiaries of the United States Steel Corporation, and it is understood that the transfer has been made to facilitate operations.

The Universal company is operating at full capacity at its local plant, with regular working force, and has scheduled a large volume of orders ahead.

The Security Lime & Cement Co., Baltimore, Md., is active at its mill at Security, near Hargerstown, Md., utilizing a large percentage of the production in the Baltimore district. In order to secure the necessary working force, a large number of foreigners are now being given employment. Extensions and improvements have recenty been made at the mill.

The Clinchfield Portland Cement Corporation, Kingsport, Tenn., has purchased a tract of property about 20 miles from Macon, Ga., and has plans under way for the erection of a large cement plant on the site. The initial unit will consist of a number of buildings, including power plant, pumping plant, machine shop and other mechanical structures and is estimated to cost in excess of $500,000, with machinery. It will be equipped for a capacity of about 2,000 barrels of material per day. At a later date it is expected to construct another plant unit which will more than double this output. The works will be equipped to use the wet process system and wherever possible individual motor drives will be used for the equipment. It is planned to award building and machinery contracts at an early date, and proceed with the work. John A. Miller is president.

The Guadalupe Portland Cement Co., San Francisco, Cal., has been chartered under state laws with a capital of $3,000,000, to construct and operate a cement manufacturing plant in this section. The new company is headed by Frederick G. Cartwright, Esben Broe, Leo J. Pope and Robert Dunlay. It is represented by Boswell F. King, Humboldt Bank Building, San Francisco.

Selecting Quarry Cars

One consideration in selecting cars for pit and quarry operations is whether or not the cars shall be constructed of wood or steel. There are advantages and disadvantages of each kind of construction.

In a discussion of this kind it is not the desire of the writer to talk against any particular make of car or to injure in any way a manufacturer, but rather to discuss in a general way the economic features of wooden and steel cars. Fortunately most manufacturers build cars of both materials.

Some years ago cars for these purposes were built almost entirely for hand loading. When steam shovels began to be used in quarries naturally the cars designed for hand loading were used in connection with steam shovels and under the rough uses they quickly went to pieces and were put by as junk. This was especially true of all steel cars which were of very light construction. At the same time few operators had much of a repair shop, in fact but little more than a blacksmith shop, so that they were not able to make many repairs on these steel cars. For these reasons the writer favored some years ago a wooden car. For stone handling he favored a wooden car lined with steel. Such a car, even in a blacksmith shop, if the trucks were still in good shape, could be almost entirely rebuilt, while the all steel cars were difficult to repair.

With the coming of the large machines, not only for loading products but also for crushing, washing and screening, the car manufacturers during the past decade have entirely revolutionized industrial car-building. Many new types have been developed and cars have been designed and built to carry large loads and stand hard and rough uses. Another factor that enters into this proposition is that pit

and quarry operators have found it necessary to maintain considerable of a repair shop, so that repairs can be made promptly to any machinery, and this has allowed them to maintain almost any kind of a car in first class working order. Thus it is no longer necessary to select cars for quarries with a view of keeping them in repair. Today cars should be selected for the kind of material they are to handle, the method of loading them, the method of dumping them and the capacity desired.

There are many all steel cars that will give long life even for heavy rock handling, for they are built of heavy castings and large gage pressed steel shapes that are not easily dented or bent out of shape. This is illustrated by the fact that many side dump cars now have the sides or doors made of steel and although large rocks continually hit them as the cars are dumped, yet the life of these doors is many times that of wood.

Just as the steel car has been improved so has the wooden car. Experience has taught that heavy hard wood protected by steel plates give long life and are easily repaired. For this reason many flat bottom cars still have their bottoms of this construction. For rock work it is not advisable to use wood in the construction of cars without having it heavily armored. Even for hand loading this is necessary.

Wood is used for cars that are built square, but when curved shapes are desired the car is generally built of steel. This is especially true of all V shaped cars that dump over the sides, by tipping. Today the writer does not believe that whether a car is built of wood or steel, or a combination of the two, is any longer a governing factor in selecting cars.

Indiana News And Comment

Account of Bedford Stone Club Auxiliary Hearings

By Our Indianapolis Correspondent

Declaring the Bedford Stone Club Auxiliary to be a combination in restraint of trade, Julge Z. E. Dougan, of the Hendricks, Ind., circuit court, has entered an order forfeiting the charter of the auxiliary and directing that its affairs be closed. The International Cut Stone Contractors and Quarrymen's Association, another defendant, was barred from future operations in Indiana. Both organizations filed notice of appeal to the supreme court and this will act as a stay in the execution of the judgment of the court for a period of six months.

U. S. Lesh, attorney-general of Indiana, who conducted the prosecution of the case against the stone companies, sought to have the court enjoin the defendants from carrying on operations complained against pending the action of the supreme court, but Judge Dougan refused to enter such an order.

"I do not believe it to be necessary," said Judge Dougan in response to the request of the attorney-general. "These defendants impress the court as wishing to do the right thing in this matter and the court does not wish to hamper them in the conduct of their business pending a decision of the supreme court."

Seventeen other stone companies of Indianapolis were cleared of the charge of combining in restraint of trade by the decision of the court. Their connection with the case was through their memership in the Bedford Stone Club Auxiliary, which was charged with intimidating independent stone companies in so controlling its members that it could fix prices and control the production of Bedford stone.

The state of Indiana has won a victory over the alleged Bedford stone trust when Judge Z. E. Dougan in the Hendricks Circuit court sustained the state's anti-trust suit against fourteen defendant stone companies, according to word received by Attorney General U. S. Lesh.

The defendant companies have been

using the International Cut Stone Contractors and Quarrymen's Association of Indianapolis and the Bedford Stone Club Auxiliary, Inc., as means to cover violations of the state anti-trust law, according to the findings of the court.

The court ordered the international organization to leave the state, directed the club to go out of business, and found against the defendants.

Conclusions of law in the case are not to be handed down by the court until later after arguments have been heard, it was said.

"The court finds," said the special findings of fact of the judge, "that prior to the bringing of this action the defendants entered into a scheme, design, understanding, combination and conspiracy to limit, restrain, retard, impede and restrict bidding for the letting of contracts, for the furnishing of stone to be used in private and public buildings in this state and elsewhere, in the furtherance of which scheme, design, understanding, combination and conspiracy said defendants did in a material, wrongful and unlawful way suppress competition in the production and sale of building stone in said state; and they did limit, restrain, retard, impede and restrict bidding for the letting of contracts for private and pubic works requiring the use of stone in said state and elsewhere."

Defendant companies in the case are the Bedford Cut Stone Company, Imperial Stone Company, Consolidated Stone Company, Central Oolitic Stone Company, J. P. Falt Company, Furst-Kerber Cut Stone Company, J. Hoadley Stone Company, Interstate Cut Stone Company, Matthews Bros., Perry Stone Company, John A. Rowe Cut Stone Company, Shea & Donnelly Company, Henry Strubble Cut Stone Company and C. Ittenbach Company.

Following the decision of the Judge of the Hendricks Circuit court at Danville, Ind., to the effect that the Bedford Stone Club Auxiliary and the International Cut Stone Contractors and Quarry Men's Association are combinations in restraint of trade, Walter W. Drayer, secretary of the international organization, declared in a statement that indications pointed to removal of the companies from the state. The organizations were given six months under court order to close up their business. According to Mr. Drayer, the individual companies will have much difficulty in operating under the court order's provisions and he predicts the removal of both finances and fabricating plants from the stone districts in the southern part of the state.

He said this action would not be a retaliatory measure against any one because of the ruling, but merely a measure of protection on the part of the companies, who would be forced out of business if they remained in Indiana.

In his statement he said:

"The bringing of this action was based upon a number of ridiculous allegations, namely: That the defendants maintained a monoply in the limestone industry; that they conspired to fix prices; that they incited strikes for the purpose of limiting production; that they created a slush fund to reimburse members who had taken work from nonmembers at a loss (and mind you we were charged in the state's bill of complaint with fixing prices); that they divided territory and that they refrained from bidding on Indianapolis work against local firms.

"Not one of these slanderous allegations were proven, in fact, no evidence was introduced in the hearing in support of them. It seems apparent that but a cursory investigation was made prior to the bringing of this complaint, otherwise the state would have deterred prejudicing public opinion against one of Indiana's greatest industries by any such ridiculous allegations.

"The stone trade in the past has been the victim of a deplorable and pernicious practice of price cutting. In the evolution of the building industry whereby the general contractor, rather than the architect or owner became the agency through whom subcontractors had to obtain their work, a damnable system of misrepresentation and bargaining with an owner's property was set up by too many unscrupulous general contractors.

"General contractors of this class, after obtaining bids on various branches of the work to be sublet, and using such bids as a basis for making up their own general estimate on which they obtained the work, set out to shop these various branches of the work. They never thought of giving the stone work to the stone contractor whose legitimate competitive bid they used to obtain the work.

Rather did they set out to get subsequent bids, and in doing so they not only communicated the low competitive bid, but oftentimes misrepresented it, agreeing to give the work to the contractor who would cut 5 or 10 per cent off the fictitious figure they represented to be the lowest bid. This brought no saving to the owner. He paid for the stone work the figure obtained by the general contractor in the original competitive bidding. The general contractor pocketed what he was able to save by peddling and shopping the work as additional profits. The owner, due to the fact that the cut stone contractor who did take the work did so at a figure below cost, got a job in keeping with such figure. In other words the quantities were curtailed, while the grade of material and the workmanship were slighted.

"Due to this pernicious practice thousands upon thousands of dollars have been sunk in quarry property and equipment in Indiana that will remain there until judgment day, while the investors went broke.

"Now the stone trade, in order to stabilize the business, to eliminate these leeches from the building industry, and to give to the owner a faultless job in keeping with the architects plans and specifications at a minimum cost, set up a principle whereby it would bid in open and legitimate competition, the individual firms exercising their rights to decline to submit subsequent figures upon a job on which competitive figures had been previously taken and the general contract awarded. Surely a commendable principle; one that stabilized and placed the industry upon a straightforward business plane and one that assured the owner of a job in keeping with his architect's plans and specifications at a minimum cost. The method by which we sought to accomplish this principle the court has held to be in violation of a state anti-trust law.

"It would seem that what our government, Federal and state, requires today is a definition of trusts; what is and what is not a trust. Anti-trust legislation was set up a number of years ago to prevent gigantic combinations of capital from monopolizing business, and rightfully so. The courts now place a very wide construction upon these anti-trust laws, which, unless modified, is going to have a demoralzing effect upon American industry. To class as a trust a vast number of individual competitive interests that endeavor through an association to place industry upon a high ethical plane of responsibility and integrty for the benefit of the public and the industry is both ridiculous and destructive.

"If the state's attitude is to be upheld, and we understand it to be the attorney general's position that all associations of competing interests are inimical to the law of Indiana, then Indiana will indeed drive many of her prominent industries out of the state. As for the stone trade, nature has of course located the quarries in Indiana, but as the capital that has made this great industry possible has come from other states, that capital and the plants that make possible the industry that gives employment to thousands of people at maximum wages, will undoubtedly be forced to locate in other states."

H. P. Radley, age sixty-eight, president and general manager of the Bloomington and Bedford Stone Company and one of the widely known of the stone operators of the Bloomington-Bedford district, died July 2 of uremic poisoning following a short illness. Mr. Radley for years has been one of the leading stone operators of Bloomington and Bedford. He was connected with John R. Walsh in the days when Walsh was prominent in Chicago and southern Indiana. He was for a time general freight agent of the Walsh railroad. He was then sent to Bedford by Walsh and had charge of the Walsh stone interests. Following the Walsh failure, Mr. Radley continued in the stone business and ten years ago removed to Bloomington. He took a prominent part in local affairs, was a director of the Bloomington Chamber of Commerce and an active Democrat. The widow survives.

The Indiana Concrete Products Company, with a capital of $10,000, has been incorporated to manufacture concrete products at Indianapolis. Chales E. Phillips, Joseph Erpelding, Lawrence Erpelding, Vincent Erpelding and Nora D. Erpelding are the directors of the company.

The Medusa Cement Manufacturing company represented by W. B. Newberry of Cleveland is considering the establishment of a large cement factory east of Logansport, Ind., if the proper quality is found during the

tests now being conducted. Tests have been made on several farms in the vicinity. Options for tests were taken on several hundred acres of land in the vicinity of the plant of the Logansport Stone and Construction Company, Lime Kiln, a few years ago. It is said that a certain grade of clay used in the manufacture of cement has also been found in Cass county.

The Meshberger Bros. Stone Company has incorporated at Linn Grove, Ind., with a capital of $100,000, $50,000 preferred stock, to operate stone quarries. The directors are Harry Meshberger, Oscar Meshberger and Jane Meshberger.

The interstate commerce commission's order in the cement rate case, which was instituted by the Cement Manufacturers' Association of Chicago, means that the intra state rates on cement in Indiana will be higher, but will not be discriminatory, according to H. A. Hollopeter, assistant traffic manager of the Indiana State Chamber of Commerce.

"The revision, in all probability," Mr. Hollopeter said, "will mean an equalization with the interstate rates, which are higher, and which would not be lowered to the level of the Indiana intrastate basis. Indiana consumers of cement, however, would not suffer, as similar intrastate rates on cement in Illinois would be raised accordingly to the new Indiana or interstate rate level."

Indiana's principal cement production centers are Limedale, near Greencastle, Bluffington and Stroh.

The reopening of the Indiana Board and Filler Company case, Mr. Hollopeter said, meant merely the transfer of the case to the jurisdiction of the public service commission, from which it was taken as a result of the injunction obtained by the railroads from the federal court against the public service commission's order. The case was instituted by the State Chamber of Commerce.

The Bloomington Crushed Stone Company, Bloomington, Ind., has filed certificate of final dissolution.

The Morocco Sand and Gravel Company, Morocco, Ind., has been incorporated with a capital of $25,000; $10,000 preferred stock. They will mine sand and gravel. The directors of the company are M. E. Graves, J. R. Deardurff, Ross Lucas, J. B. Redden, Frank Billings and Fred G. Richmire.

The Kickapoo Sand and Gravel Co., located west of Peru, Ind., is rapidly approaching completion and will soon be ready for production. The side tracks have been laid, the concrete storage tanks have been completed and the large transformers set and filled with oil. When completed and in operation this plant will be one of the largest gravel pumping plants in the state.

E. B. Thornton, Bedford, Ind., stone operator, has bought a ten-acre tract of heavily wooded land inside the city limits, of the Kramer heirs, and after beautifying it by landscape gardening, will present it to the city for a children's playground.

A motion for a new trial was filed June 22 at Marion, Ind., by taxpayers in the case of John Weigel, contractor, who seeks to collect $8,393.54 for gravel which he asserts he supplied to the county. Payment of the bill was held up by the auditor because of the protest made by John Pinkerman and other taxpayers. The commissioners allowed the bill, but an appeal was taken to the circuit court by the farmers. Trial of the case recently came to an abrupt ending when Judge J. Frank Chalres instructed the jury to return a verdict for Weigel. The motion for a new trial says that the court erred in not permitting certain evidence to be heard. Farmers resisted payment of the claim on the ground that Weigel's measurements were in excess of the amount of gravel the county actually received. The court ruled that the measurements of the state board of accounts engineer for the taxpayers was taken six months after those of the county surveyors and Weigel, and that gravel had been taken out of the same pit in the interval.

Vern Kirkendorfer, who several months ago purchased a 40-acre farm in Elkhart County, Ind., near the Kosciusko county line, did not know at the time that he would pay for it within a few months with gravel taken from a pit on the place that had long been unsalable. Lawrence W. Seaman of Goshen, has road contracts under way in Elkhart and Kosciusko counties aggregating $250,000. Instead of shipping in gravel he has erected a washing plant on the Kirkendorfer farm and is hauling material in Ford trucks to three roads.

The Production of Fines

The production, care and disposal of the fines from any quarry plant generally offer serious considerations for the operator. No matter what care is taken to reduce the percentage of fine materials, there are always varying amounts coming from the crushers.

"Fines" is a term that can cover many different sizes of small stone. The presence of these small sizes depend on the amount of rock that is being quarried, the way the rock lies in the ledge, and more particularly on the sizes of stone produced and the purposes for which this stone is to be used. For example, if a quarry is producing almost entirely a limestone for fluxing purposes, all material that is too small for flux stone can be classed as fines. This would mean that any stone which went through a 2½-inch ring would be so classified. In a quarry producing stone for road purposes only there would be nothing larger than 2½-inch or 3-inch stont, while the fines would all be ½-inch or smaller. It can thus be seen that in the flux stone quarry the fines would include all the stone grades that would be produced in an operation conducted for the purpose of securing stone for roads. This shows how difficult it is to use the common term fines and still distinguish between certain sizes.

These two illustrations likewise point out how necessary it is for a quarry producing crushed stone to be able to sell all the sizes. Thus, a quarry turning out stone for fluxing purposes should likewise sell concrete aggregate and stone for road purposes, so that all sizes produced will have a market. Of course, if this can be accomplished the subject leaves no material for discussion, and the problem answers itself. But in a large number of cases this is not possible, or rather it is not being done, and the subject of fines is a "live" one. The question may be viewed from two angles—one looking toward reducing production of fines, and the other toward selling those that are produced.

Softer stones, such as sandstones and most of the limestones, particularly when the ledges are laminated and the strata broken up through earth pressures and the action of water, result in the production of a higher percentage of fines than is found when hard granite, trap, gneiss, schist, and similar rock are crushed. Another factor that governs the amount of fines is the smallness to which the stone must be crushed and the number of crushers through which it must be put. If stone from 1 to 3 inches is desired, and more than 50 per cent must be over 2 inches, there would not be as many fines produced of the same kinds of stone as if more than 50 per cent must be between 1 and 2 inch ring stone. Then again, if most of the stone produced must be from 1 inch and under there would be a larger percentage of fines than if 1½ and 3 inch stone were being produced.

Modern crushing plants have primary and secondary crushers, and many cases put the stone through a number of small finishing machines such as those of the disc type which take care of larger material from the secondary crushers. This passing of stone through three sets of crushers means more grinding, and consequently more fine material.

In some few cases quarries find sale for all their fines, having trouble only in the disposal of the coarser materials. In some cases these quarries have little trouble due to the fact that they can recrush the larger sizes of stone, thus turning out everything with fines. It is not meant in this article to consider such quarries, but only those that are producing an excess of fines.

In order to solve a problem of this kind it is first necessary to find out certain facts. The first of these facts concerns itself with the amount of dirt fed with the stone into the crusher. Should this dirt be present in considerable quantity it would naturally increase the volume of dust, and also render the dust unfit for sale if it were possible otherwise to sell this material. There are two methods of preventing dirt from entering the crusher. The first one naturally is to observe considerable care in the work of stripping, and make certain that the top of the rock has been cleaned and is free of all spoil. If this cannot be easily done by the ordinary methods, it might be advisable to wash the top of the ledge, if such a procedure can be carried out easily and cheaply. However, if all the dirt cannot be taken off the rock, or if there are pockets of dirt in the ledge, this objectionable material should, as far as possible, be picked up on the quarry floor and disposed of separately.

No matter how great the amount of care is taken, some dirt will be loaded with the stone and carried to the crush-

er. If this dirt occurs in considerable quantity its entrance into the crusher can be prevented by the use of a grill or grizzly, which will permit the stone to slide into the crusher and the dirt to fall through. In certain cases it might even be economical to install a grizzly feed which might eliminate a large percentage of the undesirable material. In such a case only that dirt which is actually adhering to the rock would be carried to the crusher. Under the grizzly could be built a hopper feeding a belt conveyor that would carry the dirt to one side, where it could be disposed of by some cheap method.

With the stone entering the crusher entirely free of dirt there would be less fines. If more than one crusher were used there should be an arrangement to take out all the finer stone from the product after it had passed through the crusher. This is especially so if the ledge is overlaid with a fair amount of soft disintegrated rock that will not be acceptable for the product sold unless it is included with the dust or very small size screenings. A large percentage of such rock will be pulverized by most primary crushers. This material and the very fine stone should be taken out of the product as soon as it passes through the crusher.

Here is where the screening should be done, and many plants now have what is called a scalping screen immediately below the primary crusher. If an operator has no trouble in selling his fines all he needs is this scalping screen, but if he is producing an excess of fine material it is obvious that he is making a mistake in passing through his crushers a second time stone that does not need recrushing. At this point he should take out all of the dust, and all stone that will grade smaller than his largest product, only passing on as tailings to the other crusher the stones that are too large to grade in with his product. This does not mean that an operator must have bins under such a screen, but there should, however, be small hoppers to catch the product and allow a chute or belt conveyor to carry them on to an elevator which will bring them through the grading screen. Thus, a screen that is directly below the primary crusher should have a ring that will allow everything from dust to the maximum sized product to pass through it. With a dust jacket the dust will be taken out and carried away from the dust in the grizzly. The tailings of such a screen should go through the secondary crusher while the crushed product could be carried to the elevator. This same arrangement can be made after the stone passes through the secondary crusher if it is to be carried on to a third reduction machine. But, if only the tailings are to be allowed to enter the third crusher, as they should be, then a second screen is not necessary.

This arrangement would materially reduce the percentage of fines, which can be further reduced by paying careful attention to the setting of the crusher. If either the primary or the secondary crusher is turning out too much fine stuff, it would be better to open up the crusher and allow more stone to pass through unbroken, brining this back to be recrushed. As this stone will be free of all fine stuff it is not likely to be crushed up so fine and the percentage of fines will be vary materially reduced. These are some of the ways of effectively preventing too much fine material.

The next consideration is that of selling or otherwise disposing of fines that are produced. The disposal will depend somewhat on the kind of stone that is found in the quarry. Finely ground limestone of sufficiently high calcium content and free from large amounts of objectionable material can be used to reduce soil acidity, and should be in fairly good demand in every section. It is not possible, of course, to make a similar use of such materials as crushed granite. In determining the best way to sell or otherwise dispose of fines one must first investigate the purpose these materials would serve, with particular reference to their present condition, so that re-handling, recrushing or grinding may be avoided. It is natural in most cases to assume that the most money can be made out of materials on which no additional money has been spent. This will not, of course, be true in all cases. In some instances it would pay to have the stone analyzed and tested for a variety of purposes. Investiation should also be made as to the way in which the material must be packed and shipped.

To accomplish these things there should be a responsible individual or department around whom or which a selling organization can be established. If this is done there can be easily developed a business that will not only

prove profitable but may even exceed that of producing the regular product.

Today there are many uses for these fine stone products. Fines of all kinds, including those of limestone, can be used for finely finished concrete blocks, brick and ornamental work. Stone chips can be sold for finishing concrete sidewalks, and covering bituminous wagon roads. Sewer pipes and concrete tile can also be made of these products. A certain market is also afforded by the poultry trade if the stone be sufficiently limey in character. Roofers will also require some of the output. Some states allow the use of amount of fines in road-building for macadam, tar and asphalt roads. Some finely pulverized stone can also be used for making scouring soap and powders. There are a great many other uses, some of which depend, of course, upon peculiar characteristics of the stone.

To find where such things are used and to sell or make contracts with possible users are functions of a selling organization. If regular sales cannot be made and the business is seasonable, it will be necessary to store these products as inexpensively a possible so that the material will be available when sales are made.

To some operators these facts as presented may be of little value, but the writer has seen storage piles of fines in many quarries that represent large sums of money. Even in some small quarries these piles represent several thousand dollars of cost for production only. In some large quarries that he has visited these storage piles represent the accumulation of a number of years and the cost in money of producing fines has run over a hundred thousand dollars—enough money to make an individual independently rich. These facts show the importance not only of reducing the percentage of fines, but of disposing of them as they are produced.

Quantity production will be begun by the first unit of the Blue Bonnet Lime Company's New Plant at Fort Worth, Tex. Initial production of the plant will be 150 barrels a day and this will be doubled with the completion of the second unit. A dehydrating plant with a daily capacity of fifty tons has been erected on the company's lot. This is the first plant of this nature in the territory surrounding Fort Worth.

Recent Patents

The following patents of interest to readers of this journal recently were issued from the United States Patent Office. Copies thereof may be obtained from R. E. Burnham, patent and trade-mark attorney, Continental Trust Building, Washington, D. C., at the rate of 20 cents each. State number of patent and name of inventor when ordering.

1,459,130. Rock-Crusher. William R. Young, Brooklyn, N. Y.

1,459,340. Crusher. David J. Nevill, Denver, Colo., assignor to Stearns-Roger Mfg. Co.

1,459,481. Excavating-machine. William E. Trapnell and Joseph A. Easterwood, Madisonville, Ky.

1,459,837. Vibrating screen. Benjamin A. Mitchell, Garfield, Utah.

1,459,838. Vibrating screen. Benjamin A. Mitchell, Garfield, Utah.

1,459,839. Vibrating screen. Benjamin A. Mitchell, Garfield, Utah.

1,459,840. Vibrating screen. Benjamin A. Mitchell, Garfield, Utah.

1,459,841. Vibrator for screening-machines. etc. Benjamin A. Mitchell, Garfield, Utah.

1,459,842. Screening-machine and screen-cloth therefor. Benjamin A. Mitchell, Garfield, Utah.

1,459,843. Vibrating screen. Benjamin A. Mitchell, Garfield, Utah.

1,459,844. Vibrating screen. Benjamin A. Mitchell, Garfield, Utah.

1,459,845. Screening-machine and screen-cloth therefor. Benjamin A. Mitchell, Garfield, Utah.

1,459,846. Vibrating screen. Benjamin A. Mitchell, Garfield, Utah.

1,459,847. Differential vibrator. Benjamin A. Mitchell, Garfield, Utah.

1,459,848. Percussion drill and the like. Benjamin A. Mitchell, Garfield, Utah.

1,460,008. Rock-pulverizer. Carl S. Willis, Bellingham, Wash.

1,460,073. Mining and quarrying machine. Cyrus S. Oldroyd, Cincinnati, Ohio, assignor to Oldroyd Mfg. Co., Knoxville, Tenn.

1,460,074. Motor-driven truck. Cyrus S. Oldroyd, Cincinnati, Ohio, assignor to Oldroyd Mfg. Co., Knoxville, Tenn.

1,460,075. Mining and quarrying machine. Cyrus S. Oldroyd, Cincinnati, Ohio, assignor to Oldroyd Mfg. Co., Knoxville, Tenn.

1,460,076. Mining and quarrying machine. Cyrus S. Oldroyd, Cincinnati, Ohio, assignor to Oldroyd Mfg. Co. Knoxville, Tenn.

Improvement in Steam Shovels

The latest development by the Marion Steam Shovel Company is the introduction of crawler trucks to railroad type shovels, and is one of striking importance to pit and quarry operators. It has vast potentialities to the quarry operator—lower cost, fewer men, increased output, less equipment, etc.

Almost every quarry of any size has one or more of these shovels, loading rock or stripping overburden. The investment tied up in working tracks, rails, ties and jack blocks is enormous, when taken in the aggregate the country over. All of this equipment can be eliminated with the use of these new trucks. Besides, time is saved when moving ahead or when kicking back out of the way of blasts or slides. It is stated that the actual working hours can be increased from 10 to 15 per cent and the payroll for common labor around the shovel reduced by more than 50 per cent.

One of the features about these trucks is that they can be applied to Marion shovels now in use. Thus, even an old machine can be brought thoroughly up-to-date and made to produce on a par with new equipment. All standard Marion railroad-type models can be equipped with these trucks and the company is prepared to give estimates and performance facts to any one interested.

Loose Leaf Hoist Catalog

The tenth edition of the National Hoisting Engine Company's steam, electric, and gasoline hoisting engines, is prepared in loose-leaf form. In the book are described National steel and wood derrick's, pile and sheeting hammers, and other of the company's products. The book is splendidly illustrated throughout. It shows in connection with the illustrations all information on the company's products, the information being given mostly in tabular form. At the beginning of the book are included a number of pages on construction details of the hoisting engines. The guy and stiff leg derricks described at the end of the book are illustrated with line drawings.

Copies of this tenth edition of the company's catalog may be secured by writing the National Hoisting Engine Company, Harrison, N. J.

Conveyor Weighing In Industry

As the cement and quarry industry has more and more become infused with scientific methods, the matter of accurate weights has assumed a growing importance. But coincident with the need for accurate weighing has grown the demand for speed in moving these materials to and through the plant; and speed and accuracy are two factors so opposite in characteristics that they are difficult to reconcile.

With the development of conveyors—belt, bucket or pan—the question of speedy and laborless transport of bulk materials was solved—but until a few years ago, no matter how fast these materials could be transported, if an accurate check on their weight was

required, there had to be a pause in the steady flow somewhere along the line to permit weighing.

The question then arises, how can the weight of the material be determined without seriously interrupting operations?

A conveyor weightometer solves in a clever and decidedly interesting manner the problem of weighing material while carried on a moving belt, pan or bucket conveyor, making an accurate and reliable mechanical record of the weight of the material while passing in transit and doing it without interrupting the flow.

No weighman or other attendant is required and the weights do not have to be taken by hand. Consequently, all chances of error due to the human element are removed; and with the pas

ing of the weighman goes the operating charge—his wages.

Where material is thus conveyed, it is desirable to know the amount handled, both in regard to rate of operation and total weight passed in a given time. Such records can not only be made at the scale, but by distant indicators in a central or control office, so that the progress of loading a vessel, for example, can be seen at once by reference to an autographic chart.

For example, the Michigan Limestone & Chemical Co., Rogers, Michigan, sell all their stone over conveyor weightometers. This plant ships between five and six million tons of stone yearly, the shipping season only lasting approximately eight to nine months; therefore, it can be readily seen what a difficult matter it would be to obtain the weight of such large quantities of stone if not handled by conveyors and weighed in transit. Here the stone comes from the crushers, delivered to a system of conveyors, which carry it to bins or outside storage; other conveyors are then used to move the stone to the boats or barges and on each loading conveyor a conveyor weightometer mechanically records the weight of the stone. The same type machine is used at the Tomkins Cove Stone Co., Tomkins Cove, N. Y.; Standard Lime & Stone Co., Havre de Grace, Md., and also at the Kelly Island Lime & Stone Co., Alpena, Michigan.

Cement mills keep record of material such as hot cement clinker as it comes from the kilns, also stone and shale from cars or storage and finished cement, by using the conveyor weightometer. These machines have also been adapted to proportioning cement mix.

The conveyor weightometer is made by Merrick Scale Mfg. Co., Passaic, N. J.

The Miscoast Rock Co., Santa Barbara, Cal., has been incorporated with a capitalization of $100,000. The directors are T. G. Degman, A. W. Belmont and Frank J. Richards, all of Santa Barbara.

The Laurel Hill Sand and Gravel Corp., Queens, N. Y., has been incorporated with a capital of $15,000. The Directors are: M. C. Becker, J. W. Newman and I. H. Kutz, 100 Broadway, Manhattan.

Combustion Engineers

Mr. Jos. W. Hays is just completing the organization of a corps of consulting combustion engineers to be known as Jos. W. Hays and Associates. The headquarters of the organization will be Michigan City, Indiana.

Mr. Hays has been finding it impossible for some time past to meet all of the demands upon his time, and for this reason is forming the organization.

Jos. W. Hays and Associates will be prepared to render consulting service in steam plants in all parts of the country.

Track Shifting Machine

The Lake Superior Loader Company presents to owners of industrial railway systems the Peterson patented track shifter, a simple machine built expressly for the purpose of shifting track on dumps, in open pits, on contractor's construction, on railroad construction, etc. The manufacturers claim for the device that with one man operating it the machine will replace over half the ordinary track crew with their bars and jacks and will cut the time down 75 per cent.

The track shifter moves under its own power and transports the entire crew to the job. The manufacturers claim that no track is too heavy, no ties too deeply imbedded or frozen in, no grade too steep, but what the track shifter will yank it loose. They claim that it will not kink the rail or bend the tie plates, and that its powerful action extends over such a length of track that the easy movement does not distort it in any way.

Full information may be obtained by writing the Lake Superior Loader Company, Providence Building, Duluth, Minnesota.

White Motor Company House Organ

The Albatross, monthly publication of the White Company, Cleveland, Ohio, contains information on White trucks and news about White truck users that may be of interest to producers in our field. Much of the paper, of course, is devoted to equipment that would not fit in with pit and quarry uses, but certain of it is to the point for a pit and quarry operator.

"Driver Dan" an Interesting Publication

Driver Dan, the Sterling Man is going strong. This breezy little publication, issued by the Sterling Motor Truck Company, besides being neatly and attractively printed, is well edited. The issue for Summer, 1923 talks of other things than autos and, talking well, is interesting.

Persons wishing to be put on the mailing list for "Driver Dan" should write the Sterling Motor Truck Company of Milwaukee, Wis.

Cutting Labor Costs

Pressing mechanical means into the service formerly performed by hand is the one way of overcoming the existing labor shortage, which promises not only to continue but to become more acute. While a machine can perform the duties of from one to one hundred men, depending upon its kind and application, it does not reduce the wages of those men who remain as operators and assistants to that machine.

These thoughts are brought out by an account of how R. McAllister of Philadelphia has reduced the unsatisfactory hand labor in loading delivery trucks to the minimum.

Before installing the Link-Belt portable belt conveyor that is now operating it required four good men thirty minutes to load a truck. The portable belt conveyor now loads the same two-ton truck in five minutes, with one man, and that period allowing ample time for the backing and spotting of the truck. It is said that, once in place, the conveyor-loader can handle a ton a minute, with uniform feed.

At $5.00 a day, the economy in labor costs would total a sizeable sum during the course of a month. This saving, coupled with the saving of 25 minutes per load in truck time, which earns money only while busy and which usually costs from $16 to $20 a day, soon justifies the $585 investment and the small amount of electricity required to operate the two-horse-power motor.

The machine was designd and built by the Link-Belt Company of Nicetown, Philadelphia, Pennsylvania.

Waukesha Industrial Unit

A booklet on the Waukesha Motor Company's industrial unit, besides describing that unit in detail and giving specifications on the motor, housing, radiator, clutch, and other features, shows applications of the motor in various operations in many parts of the country.

The motor is shown in each case as the power plant of a well known piece of equipment. For example, the Waukesha motors are illustrated in connection with Ingersoll-Rand air compressors, Koehring grade mixers and pavers, Penn Bridge Company cranes, Pawling and Harnischfeger shovels, Chain Belt Company mixers, George Haiss loaders, Whitcomb locomotives, Gray tractors, and Mundy hoists.

There are also shown pictures of a number of operations in which the Waukesha motor is used as a power unit to drive a number of pieces of equipment in the plant itself.

Copies of the booklet may be received by addressing the Waukesha Motor Company, Waukesha, Wisconsin.

Improved Steel Sheave Blocks

In its line of steel sheave blocks the Mining Machine Company of Mountville, Pa., claims a combination of several new features which greatly

simplify the operation of rope haulage, and eliminate to a great extent many objections common to some of the present day types. Special attention has been given to providing liberally for all parts that are subjected

KENNEDY BALL BEARING GEARLESS CRUSHERS

WHY THEY LEAD

1—They are noiseless and run like watches.

2—50% greater capacity for same power.

3—Practically no wear on anything but head and concaves.

4—Short shaft and saving in head room with packed dust collars.

5—Shaft reinforced with self-locking head so that it cannot break where 90% of shafts have broken.

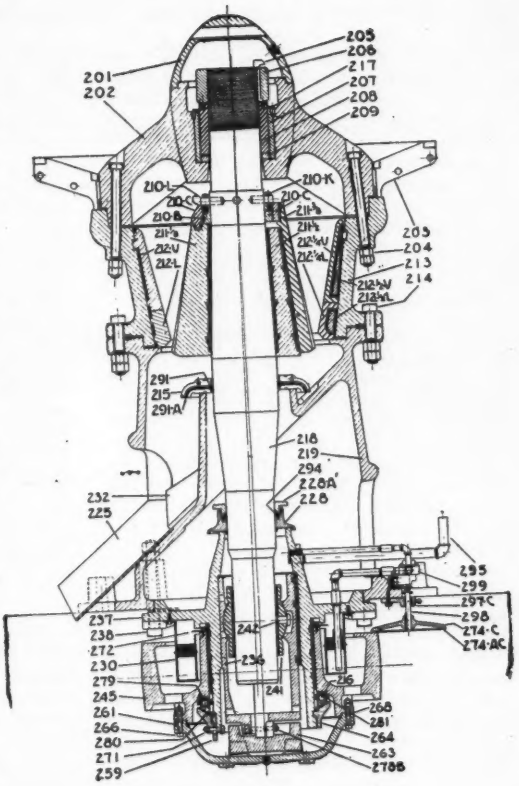
6—Can be driven right, left, or standard, as sent from shop.

7—Eccentric is turned by flexible coupling attached to pulley, which prevents side thrust and heating, as in geared crushers.

8—Ball and socket eccentric, self-aligning, eliminating friction and heating. Runs for years without attention.

9—Positive circulating oil system through filter and cut geared oil pump.

10—Made in our own shop by experts, trained for the job.



11—It is a crusher with the trouble left out. See it in operation, and you are unfit to listen to any geared crusher salesman. In fact, if you are near one of his machines, you can't hear him, if you were so inclined.

12—Our fine crusher does the work of 4 geared crushers.

Send for catalogue and tell us what your problems are, and one of our experts will call on you without obligation on your part.

KENNEDY VAN SAUN MFG. & ENGR. CORP.

50 Church St. **NEW YORK**

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to excessive strain or wear. The large clearance at the top of the pulley allows splices and knots in the rope to pass through freely. In placing the rope in position no parts are unscrewed or undone. The spacing between the fingers through which the rope passes is in proportion to the size of the rope for which each block is designed. The hub on which the pulley revolves is of large proportions and should add materially to the life and strength of the block. A special type of bearing with proper means of lubrication is provided on three sizes made by the company. There is a pulley with 7 inch diameter for ⅜ inch rope, with 8 inch diameter for ½ inch rope, and with 9 inch diameter for ⅝ inch rope. Further information may be secured by writing the Mining Machine Company of Mountville, Pa.

Portable Box Car Loader

In a four-page folder the Ottumwa Box Car Loader Company of Ottumwa, Iowa, describes its portable handy belt loader for loading into box cars such material as lime, cement, phosphate, sand and gravel, crushed stone, and silica. The manufacturers claim for this device that its quick raising and lowering features permit entering the smallest cars and loading the largest cars to capacity.

Among other features of the loader are the latest improved Alemite greasing system which does away with oiling.

The company offers to producers free service of its engineering department, which is ready to aid in solving loading problems. The engineering department is prepared to send complete information in any case without obligation. Further information can be secured by addressing the Ottuma Box Car Loader Company, Ottumwa, Iowa.

Describe Belt Conveyor Idler

The Mellin belt conveyor idler is described in Engineers Bulletin No. 4 of the Chillingworth Engineering Corporation of New York City. In the bulletin are included tabulated information, formulated for computing belt capacities in tons, horse power of horizontal and inclined belts, and ply of belt. The formulated and tabulated matter are line drawings that illustrate the particular feature being considered.

Rates on cement shipments entirely within Illinois, and within Indiana, were declared on July 10 by the Interstate Commerce Commission to be unduly preferential to producers in those states and to constitute a discrimination against shippers in Hannibal, and St. Louis, Mo. Railroads were ordered to file new schedules by October 12 carrying rates no greater on interstate shipments than are charged on shipments within the state within equal distances. The new rates must be based on distance and be not in excess of 7 cents per hundred pounds for distance of 20 miles, ranging up to a maximum of 21½ cents for distances of 700 miles.

The Trinity Portland Cement Company of Dallas, Texas, announced on July 14 the purchase of 602 acres of land, north of Fort Worth, on which will be erected a cement plant of 2,500 barrels daily capacity. The present Dallas plant of the Trinity Company is producing 4,500 barrels daily. Offices will be opened at once at Fort Worth, to provide headquarters for the project. Officers of the company active in the deal are Mr. McCourtie, and Mr. C. D. E. Ulrickson, Vice-President, and General Manager.

The Danish Motorship Leise Maersk cleared from Hamburg with a full cargo of building material for Los Angeles. In the hold were 3,000 pounds of cement. This is expected to relieve the cement shortage that has held up building operations about the harbor district of Los Angeles.

Sales representatives of the McGrath Sand & Gravel Company attended a conference in Bloomington on July 14, to map out plans to meet the prospective shortage of cars when coal starts to move in volume, during the latter part of the building season.

The Cement Manufacturing community of Portland, Colorado, was reported on July 16 to be under 5 feet of water. All communication with the town was cut off, and the extent of the damage could not at that time be ascertained.